Naval Special Warfare

PHYSICAL TRAINING GUIDE

DISCLAIMER: Preparation for this training can be equally strenuous. You should consult a physician before you begin any strenuous exercise program, such as the one described here, or any diet modification, especially if you have or suspect that you may have heart disease, high blood pressure, diabetes, or any other adverse medical conditions. If you feel faint or dizzy at any time while performing any portion of this training program, stop immediately and seek medical evaluation. The United States Government and any service member or civilian employed by the United States Government disclaims any liability, personal or professional, resulting from the misapplication of any training procedure, technique, or guidance described in this guide.

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Short Physical
Training Guide

The Naval Special Warfare Physical Training Guide is designed to assist anyone who wants to improve his fitness in order to take and pass the Physical Screening Test (PST) and succeed at Basic Underwater Demolition/SEAL (BUD/S).

This guide provides information about the type of training required to properly prepare for the rigors of BUD/S, and it offers a tailorable 26-week training plan that should help a person with average fitness prepare for training and avoid injury.

Most of your cardiovascular exercise should focus on running and swimming, and your strength and calisthenics training should be done to develop the necessary muscular strength and endurance for maximum pull-ups, push-ups and sit-ups as they are necessary for success at BUD/S. Cross-training such as cycling, rowing and hiking is useful to rehabilitate an injury, to add variety or to supplement your basic training.

Work to improve your weakest areas. If you are a solid runner but a weak swimmer, don't spend all your time running just because you are good at it. Move out of your comfort zone, and spend enough time in the water to become a solid swimmer as well.

General Training Guidelines

Your workouts should be

- Planned and organized
- Gradual, steady and continual
- Consistent
- Specific
- Balanced

WEEKLY WORKOUT SUMMARY

- 1 Long Slow Distance workout for both running and swimming
- 1 Continuous High Intensity workout for both running and swimming
- 1 Interval workout for both running and swimming
- 4-5 Calisthenics Routines
- 4-6 Strength Training Sessions – 2-3 each for upper and lower body
- 4-5 Core Exercise Routines
- Daily Flexibility Routines
- Specific injury prevention exercises as needed

WORKOUTS

Long Slow Distance (LSD)

The intensity of LSD work is low to moderate, so your pace should feel relatively easy and relaxed. These workouts build endurance and provide relative recovery between more intense sessions. To determine the appropriate intensity, use the Talk Test. You should be able to talk comfortably in short sentences or phrases while training, drawing breath between phrases. If you can't speak, you are working too hard, and if you can speak continually, you are not working hard enough. For LSD workouts, focus more on duration than intensity. If you are exceptionally fit, you might perform 40-90 minutes of continuous movement in one session. A practical goal to prepare for BUD/S is to build up to comfortably running 5-6 miles or swimming 1-1.25 miles without stopping.

Continuous High Intensity (CHI)

These sessions typically involve moving for 15-20 minutes without stopping at a pace approximately 90-95% of the maximal pace you could hold for that duration. The workout should be very demanding but not totally exhausting. On a scale of 1-10, with 10 being the greatest effort possible, the workout should feel like 8-9. If you are at a low fitness level, one repetition of 15-20 minutes is sufficient. As your fitness improves, 2-3 repetitions may be required. When performing more than one repetition, allow sufficient recovery between repetitions so you can maintain the desired intensity of 90-95% of maximal pace. A reasonable recovery period is approximately half of the work time. During this time, keep moving at a low intensity – slow jog, brisk walk or easy stroke. Do not come to a complete stop. ■

Interval (INT)

These sessions alternate short, intense work intervals with periods of recovery. The format consists of running 1/4-mile intervals or swimming 100-yard intervals, allowing a recovery period of 2-2 1/2 times the amount of time it takes to perform the work interval. Your intensity or pace should be slightly faster than the pace of your most recent 1.5-mile run or 500-yard swim. For running, your 1/4-mile interval pace should initially be about 4 seconds faster than your base pace, and for swimming, your 100-yard interval pace should initially be 2 seconds faster than your base. For example, if you recently completed a 1.5-mile run in 10:30 – 1/4 mile base pace of 1:45 – your interval training pace should be about 1:41. If you completed a 500-yard swim in 10:30 – 100-yard base pace of 2:06 – intervals should be approximately 2:04.

Begin your interval workouts with 4 intervls per session, and build progressively toward completing 10 intervals. Do not run or swim more than 10 intervals during an interval session. When you can complete 10 intervals in the prescribed times, work on gradually performing the intervals a little faster each week. Work on consistency, trying to keep little variation between your fastest and slowest interval and pacing

RUN			SWIM		
If your current pace is	**Then your workout is**		**If your current pace is**	**Then your workout is**	
	1/4-mile repeat time	**recovery time**		**100-yard repeat time**	**recovery time**
8:00-8:30	1:16-1:21	2:32-3:23	8:00-8:30	1:34-1:40	3:08-4:10
8:30-9:00	1:21-1:26	2:42-3:35	8:30-9:00	1:40-1:46	3:20-4:25
9:00-9:30	1:26-1:31	2:52-3:48	9:00-9:30	1:46-1:52	3:32-4:40
9:30-10:00	1:31-1:36	3:02-4:00	9:30-10:00	1:52-1:58	3:44-4:55
10:00-10:30	1:36-1:41	3:12-4:13	10:00-10:30	1:58-2:04	3:56-5:10
10:30-11:00	1:41-1:46	3:22-4:25	10:30-11:00	2:04-2:10	4:08-5:25
11:00-11:30	1:46-1:51	3:32-4:38	11:00-11:30	2:10-2:16	4:20-5:40
11:30-12:00	1:51-1:56	3:42-4:50	11:30-12:00	2:16-2:22	4:32-5:55
12:00-12:30	1:56-2:01	3:52-5:03	12:00-12:30	2:22-2:28	4:44-6:10
12:30-13:00	2:01-2:06	4:02-5:15	12:30-13:00	2:28-2:34	4:56-6:25
13:00-13:30	2:06-2:11	4:12-5:28	13:00-13:30	2:34-2:40	5:08-6:40
13:30-14:00	2:11-2:16	4:22-5:40	13:30-14:00	2:40-2:46	5:20-6:55
14:00-14:30	2:16-2:21	4:32-5:53	14:00-14:30	2:46-2:52	5:32-7:10
14:30-15:00	2:21-2:26	4:42-6:05	14:30-15:00	2:52-2:58	5:44-7:25
15:00-15:30	2:26-2:31	4:52-6:18	15:00-15:30	2:58-3:04	5:56-7:40
15:30-16:00	2:31-2:36	5:02-6:30	15:30-16:00	3:04-3-10	6:08-7:55

Table 1 Interval Paces

***Table 1** provides appropriate paces and recovery times for interval workouts.*

yourself to be fastest at the end of the workout. Every 4th or 5th week, it may be beneficial to increase your intensity using shorter, more frequent intervals. For example, 16-20 x 220-yard running intervals or 16-20 x 50-yard swimming intervals.

Allow enough recovery time to maintain the proper work intensity, without taking excessive time or wasting time. To promote faster, more complete recovery, use some active recovery, such as brisk walking, easy stroking or slow jogging for part of the time between intervals. ■

Calisthenics

During BUD/S and for the PST, you will be required to perform numerous push-ups, sit-ups and pull-ups. You should prepare specifically for these exercises. Using proper technique, perform sets of push-ups, sit-ups and pull-ups 4-5 times per week, resting 1-2 minutes between sets. Though the PST requires the exercises to be performed as rapidly as possible, you should perform most of your training exercises in a slow and controlled manner. The negative or downward portion should take at least twice as long as the positive or upward portion. Approximately once per week, perform a max set (maximal number of consecutive repetitions) to assess your progress.

Here are descriptions of each exercise as they must be performed during the PST. While training, you may occasionally do alternate versions for variety and additional fitness adaptations.

Push-up

- Begin in the up or front-leaning rest position, with feet together and palms on floor directly beneath or slightly wider than shoulders.
- Back, buttocks and legs should remain straight from head to heels at all times. Palms and toes remain in contact with the floor.
- Lower the entire body as a single unit by bending the elbows until the arms form right angles, then return to the starting position by extending the elbows, raising the body as a single unit until the arms are straight.

Variations Use caution with any push-up variation, since placing the hands in any position other than beneath the shoulders may create painful stress on the elbows.

- Include wide, narrow (triceps) and dive bomber
- Lift one foot off the floor
- Place feet on a raised surface slightly higher than the hands

Sit-up

- Begin by lying flat on floor with knees bent and heels approximately 10 inches from buttocks.
- Arms should be folded across the chest with hands touching the upper chest or shoulders. The feet may be stabilized if desired.
- Curl the body up, touching the elbows to the thighs just below the knees, keeping the hands in contact with the chest or shoulders.
- After touching elbows to thighs, lie back till the shoulder blades touch the floor.

Variations

- With fingers placed loosely behind neck (don't pull on neck), curl the trunk up and rotate so the right elbow contacts the left knee; lower trunk to floor and bring left elbow up to right knee; continue alternating rotations from right to left.
- Keeping shoulders on the floor and knees bent, alternate drawing each knee up to the opposite elbow. Return each leg so the foot rests on the floor while the other knee is drawn up.
- With arms across chest or fingers behind neck, keeping the knees bent, lift the legs

and hips off the floor drawing the knees towards the shoulders. After the abdominals have been fully contracted, lower the hips and legs until the feet touch the floor.

Note: for all abdominal exercises, keep the pelvis neutral and the lower back pressed to the floor to avoid putting stress on the lumbar spine.

Pull-up

- Begin suspended from the bar in a dead hang with arms and shoulders fully extended, palms shoulder width apart and pronated (overhand grip, facing away).
- Pull body up until chin is even with or above the top of the bar.
- Legs may be crossed or uncrossed as desired, but no kipping or jerking motions allowed.
- Lower the body in a controlled fashion until arms and shoulders are fully extended.

Variations

- Narrow or wide grip
- Supinated grip with palms toward the body to more completely isolate the biceps
- Hang from bar with hands adjacent and on opposite sides of the bar, palms facing inward in opposite directions, and alternately pull the right and left shoulders up to the bar (also called the mountain climber or commando pull-up) ■

PUSH-UPS & SIT-UPS				PULL-UPS			
If your max is	Then your workout is			If your max is	Then your workout is		
	Sets	Reps	Total		Sets	Reps	Total
<40	5-6	10-15	50-90	<6	5-6	2-3	10-18
40-60	4-5	15-20	60-100	6-9	4-5	4-5	16-25
60-80	4-5	20-25	80-125	10-12	4-5	5-6	20-30
80-100	3-4	30-40	90-160	13-15	3-4	8-10	24-40
>100	3-4	40-50	120-200	>15	3-4	10-12	30-48

Table 2 Push-up, Sit-up, Pull-up Progression

***Table 2** provides specific training recommendations to improve your maximum number of push-ups, sit-ups and pull-ups.*

Strength Training/Weight Lifting

Muscular strength is necessary to enhance performance on the PST and increase the likelihood of success at BUD/S. It is important to gain strength properly to avoid injury.

There are many different training protocols for building strength and numerous methods of providing adequate resistance, including free weights, machines and body weight. For the purposes of this training, generally perform a single set of 8-12 repetitions (occasionally 4-6 reps or 15-20 reps) of various exercises that target major muscle groups.

You can occasionally perform a second set to provide additional training stimulus, but in most cases one set is sufficient to produce significant increases in strength. Perform a single set using a weight that cannot be lifted more than 8-12 times giving maximal effort and using proper technique. Generally perform 8-12 exercises per session.

Move from one exercise to the next quickly, only resting the amount of time it takes to set up the proper weight at the next station. This promotes overall intensity and some cardiorespiratory adaptations. Use a split routine of upper body and lower body exercises on alternate days.

To the right is a list of exercises you might incorporate into your strength program. This list is not definitive, and individuals may create personalized routines based on equipment availability and individual preferences. Alternate a variety of exercises that involve pushing (extension) with pulling (flexion) and target several major muscle groups. Avoid exercises that require high levels of skill unless you are under the supervision of a qualified coach.

Upper Body Exercises

Lat pull-downs, shoulder (military) press, biceps curl, bench press or incline press, seated row pull, deltoid lateral raise (raise arms parallel to the ground but no higher), upright row, triceps extension or dips.

Lower Body Exercises

Lunges, leg curl, back hyperextension, dead lifts, leg press or squats, and heel raises. ■

Core Exercises

It is important to develop the strength **and endurance** of core muscles in the abdominal and spinal regions. This will improve overall body balance and alignment, improve stability and reduce injury. Sit-ups and push-ups, which should be performed regularly in preparation for BUD/S, are important core exercises. Additional core exercises include the bridge, plank, and bird dog.

Bridge

- Lie on back with knees bent and feet about ten inches from buttocks.
- Keep arms at sides or folded across the chest and keep the pelvis neutral.
- Raise the hips off the floor, creating a straight line between the knees, hips and shoulders.
- Lift the right foot off the floor and extend the leg until it is straight and creates a line from the shoulder through the hip, knee and foot.
- Meanwhile, support the body's weight by statically contracting the glutes and hamstring of the left leg. Make sure to keep the pelvis neutral and horizontal; don't let it dip toward the unsupported side.
- Hold the contraction for 3-4 seconds before lowering the pelvis to the floor with both feet near the buttocks in the original starting position.
- Lift the left foot off the floor and extend the leg while supporting the body's weight with the right leg in the same manner for 3-4 seconds.
- Continue to alternate between legs.

Plank

- Lie face down on floor with legs straight and feet together, place forearms on floor with elbows directly below shoulders, then raise body off the floor so weight is supported by toes and forearms.
- Hold body in this position by statically contracting the core muscles, maintaining a straight line from heels to shoulders.

Variations

- Lift each arm and leg off the floor one at a time in turn, holding each position for several seconds before moving to the next position. Make sure the torso remains stable.
- Hold one arm and the opposite leg off the floor simultaneously.

Side Plank

- Lie on one side supporting body weight on one forearm with elbow below shoulder and resting the other arm along the side of the body.
- Don't let the hips sag towards the floor. Hold the spine and legs in a straight line by statically contracting the core muscles.
- Hold for desired length of time and switch to the other side.

Variations

- Maintain core contraction while lifting the top leg off the floor by abducting the hip.
- Raise the body higher off the floor by extending the support arm completely straight and supporting the weight with one hand, meanwhile extending the opposite arm

straight above the body.

Bird Dog

- Begin on hands and knees, with hands directly below shoulders and head & neck aligned with back.
- Raise the right arm until it is fully extended and parallel to the floor. Simultaneously raise the left leg until it is fully extended. The arm, leg and back should all be in the same horizontal plane.
- Keep the torso stable; do not let the hip drop on the unsupported side.
- Hold for 3-4 seconds, then lower the upraised arm and leg to the starting position, and raise the opposite arm and leg to the same extended positions.

Superman

- Lie face down on floor with legs straight, feet together and arms straight and extended overhead.
- Keeping arms and legs straight, lift both hands and both feet several inches off the floor and hold for 3-4 seconds.
- Relax for 1-2 seconds and repeat.

Variations

- Keeping arms and legs straight, lift one hand and the opposite foot several inches off the floor and hold for 3-4 seconds. Return to starting position and simultaneously lift the other hand and foot. Continue to alternate lifting opposite hands and feet.

Wipers

- Lie on your back with legs extended straight and together, and arms outstretched away from the body.
- Lift the legs together till they are perpendicular to the ground (hips flexed to 90 degrees). Keeping the hips flexed to 90 degrees, rotate the lower torso and pelvis to one side so the legs contact the ground.
- Rotate the lower torso and pelvis through a 180 degree arc till the legs contact the ground on the other side. Swing the legs back and forth through a 180 degree arc (like a windshield wiper). Each arc counts as one rep.
- Keep the upper back, both arms and shoulder blades in contact with the ground at all times.

Note: Effective core training is as much about learning to activate the lesser-used muscles as it is about increasing their strength. You should activate the transverse abdominis during each session. You can feel this muscle when you cough, and one technique to activate it during core exercises is to cough before performing a core exercise and to make sure you feel this muscle contracting during the exercise.

EXERCISE	WEEK				
	1-6	7-11	12-16	17-21	22-26
Bridge	2 x 20 reps (alternating)	2 x 25 reps (alternating)	3 x 20 reps (alternating)	3 x 25 reps (alternating)	3 x 30 reps (alternating)
Plank	2 x 30 sec	2 x 45 sec	3 x 40 sec	3 x 50 sec	3 x 60 sec
Side Plank (each side)	2 x 30 sec	2 x 40 sec	2 x 45 sec	2 x 50 sec	2 x 60 sec
Bird Dog	2 x 20 reps (alternating)	2 x 25 reps (alternating)	3 x 20 reps (alternating)	3 x 25 reps (alternating)	3 x 30 reps (alternating)
Superman	2 x 10 reps	3 x 8 reps	2 x 12 reps	3 x 10 reps	3 x 12 reps
Wipers	2 x 20 reps	2 x 25 reps	3 x 20 reps	3 x 25 reps	3 x 30 reps

Table 3 Core exercise Progression

Table 3 *is an example of how training might be structured. Work up to being able to complete the sets and reps listed in each time period.*

Flexibility

Flexibility requirements vary depending on the activity and the person, but you should devote some time to stretching to maintaining or enhancing flexibility. Perform stretching exercises after running and swimming workouts, while muscle and connective tissue temperature is still elevated. ■

26-WEEK TRAINING PROGRAM

Table 4 shows how to combine all the workouts contained in this guide into a 26-week training program. This schedule of cardio and strength activities and distance targets for running and swimming over a 26 week period will help prepare you for BUD/S and the PST.

	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY	
Week	Cardio	Strength	Cardio	Strength	Cardio	Strength	Cardio	Strength	Cardio	Strength	Cardio	Strength
	Run LSD (miles)	Upper/ Core	Swim CHI (min)	Lower/Push-Sit-Pull	Run INT (reps)	Core/ Push-Sit-Pull	Swim LSD (yards)	Core/ Push-Sit-Pull	Run CHI (min)	Upper/ Core	Swim INT (reps)	Lower/Push-Sit-Pull
1	3	X	15	X	4	X	1,000	X	15	X	4	X
2	3.25	X	15	X	4	X	1,100	X	15	X	4	X
3	3.5	X	16	X	5	X	1,200	X	16	X	5	X
4	3.75	X	16	X	5	X	1,300	X	16	X	5	X
5	4	X	17	X	6	X	1,400	X	17	X	6	X
6	4.25	X	17	X	6	X	1,500	X	17	X	6	X
7	4.5	X	18	X	7	X	1,600	X	18	X	7	X
8	4.75	X	18	X	7	X	1,700	X	18	X	7	X
9	5	X	19	X	8	X	1,800	X	19	X	8	X
10	5.25	X	19	X	8	X	1,900	X	19	X	8	X
11	5.5	X	20	X	9	X	2,000	X	20	X	9	X
12	5.75	X	20	X	9	X	2,100	X	20	X	9	X
13	6	X	2 x 12	X	10	X	2,200	X	2 x 12	X	10	X
14	6.25	X	2 x 12	X	10	X	2,300	X	2 x 12	X	10	X
15	6.5	X	2 x 12	X	10	X	2,400	X	2 x 12	X	10	X
16	6.75	X	2 x 14	X	10	X	2,500	X	2 x 14	X	10	X
17	7	X	2 x 14	X	10	X	2,600	X	2 x 14	X	10	X
18	7.25	X	2 x 14	X	10	X	2,700	X	2 x 14	X	10	X
19	7.5	X	2 x 16	X	10	X	2,800	X	2 x 16	X	10	X
20	7.75	X	2 x 16	X	10	X	2,900	X	2 x 16	X	10	X
21	8	X	2 x 16	X	10	X	3,000	X	2 x 16	X	10	X
22	8.25	X	2 x 18	X	10	X	3,100	X	2 x 18	X	10	X
23	8.5	X	2 x 18	X	10	X	3,200	X	2 x 18	X	10	X
24	8.75	X	2 x 18	X	10	X	3,300	X	2 x 18	X	10	X
25	9	X	2 x 20	X	10	X	3,400	X	2 x 20	X	10	X
26	9.25	X	2 x 20	X	10	X	3,500	X	2 x 20	X	10	X

Table 4 26-Week Training Program

*Perform **daily** stretching/flexibility exercises following cardio training.*

Warm-up & Cool-Down

The more intense your training session is, the longer the warm-up and cool-down periods should be. Warm-ups for LSD sessions may involve 5-10 minutes of easy jogging or paddling while gradually building the intensity to a comfortable level for beginning the workout. As the workout begins, you may continue to build intensity so that you comfortably finish the workout at a faster pace than you started. For CHI and INT workouts, you should warm up for 10-15 minutes **or more**. Gradually build intensity from an easy jog or stroke for several minutes. Then add 4-5 high-intensity bursts lasting from 15 to 30 seconds. The warm-up should elevate your heart rate substantially, increase your breathing rate and activate a sweat response. A proper cool-down following LSD workouts may involve 2-3 minutes of easy jogging or stroking followed by 2-3 minutes of brisk walking. Time periods for CHI or INT cool-downs should be extended until you are breathing easily and your heart rate is close to its normal resting value.

BUILD YOUR OWN SCHEDULE

Weekly Schedule

Table 5 shows how a weekly workout schedule can be organized to prepare for the PST and BUD/S. An AM-PM training format such as lifting and core work in the morning and running or swimming plus stretching in the evening is best. It allows good recovery and a high quality of work for each session. However, if necessary, all training can be performed in one extended block of time. If performing several activities in one session, perform your weakest activity first while you are still fresh. Avoid over-exercising a body part with too many exercises or activities in the same day. Note that the schedule does not place upper body strength training and swimming or lower body strength training and running on the same days.

Since there is some overlap between the demands of weight lifting, calisthenics and core exercises, do not combine more than two of these routines on a given day.

You can do some calisthenics and core training on the same day as strength training, but don't exhaust yourself with all routines on the same day. If you are already doing higher LSD mileage, you may begin at a later week in the program or add a second LSD session (see **Table 7**). You should always begin CHI and INT portions of the program at Week 1.

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Run	LSD		INT		CHI	
Swim		CHI		LSD		INT
Lift	Upper	Lower			Upper	Lower
Calisthenics		X	X	X		X
Core	X		X	X	X	
Flexibility	X	X	X	X	X	X

Table 5 Weekly Training Schedule

Progression

Gradually build up your workload from a safe, manageable level to the highest level of fitness possible in the time you have available before you take the PST or attend BUD/S.

Table 6 shows how to increase your workload across the different training bands over 26 weeks. If you are at a high level of fitness, you may choose to begin with a higher training volume such as a 5-mile run (as indicated in Week 9) rather than a 3-mile run.

	LSD		CHI	INT
Week	Run (miles)	Swim (yards)	Run/Swim (mintutes)	Run/Swim (reps)
0	1.5 (timed)	500 (timed)		
1	3	1,000	15	4
2	3.25	1,100	15	4
3	3.5	1,200	16	5
4	3.75	1,300	16	5
5	4	1,400	17	6
6	4.25	1,500	17	6
7	4.5	1,600	18	7
8	4.75	1,700	18	7
9	5	1,800	19	8
10	5.2	1,900	19	8
11	5.5	2,000	20	9
12	5.75	2,100	20	9
13	6	2,200	2 x 12	10
14	6.25	2,300	2 x 12	10
15	6.5	2,400	2 x 12	10
16	6.75	2,500	2 x 14	10
17	7	2,600	2 x 14	10
18	7.25	2,700	2 x 14	10
19	7.5	2,800	2 x 16	10
20	7.75	2,900	2 x 16	10
21	8	3,000	2 x 16	10
22	8.25	3,100	2 x 18	10
23	8.5	3,200	2 x 18	10
24	8.75	3,300	2 x 18	10
25	9	3,400	2 x 20	10
26	9.25	3,500	2 x 20	10

Table 6 Workout Progression

More Time to Prepare

Beyond 26 weeks, do not increase INT or CHI distances. Rather, focus on gradually and progressively increasing intensity for the set distances of these workouts. You can also increase your LSD work by performing longer sessions and/or increasing the number of sessions per week as shown in **Table 7.** However, beyond 9-10 miles of running per week and 3,500-4,000 yards of swimming per week, the improvements in fitness become proportionately smaller relative to the time invested. If you perform large amounts of LSD work, be sure to keep the pace relatively relaxed.

As your fitness improves, occasionally incorporate a longer session of activity (2-3 hours) such as hiking, canoeing, road cycling or mountain biking at a comfortable but steady pace to improve physical and mental endurance. Continue to progressively increase your muscular strength and endurance using the calisthenics, strength and core routines already established. ■

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Run	LSD 8 miles		INT 10 x 1/4 mile	LSD 4 miles	CHI 2 x 20 minutes	
Swim	LSD 1,500 yards	CHI 2 x 20 minutes		LSD 3,000 yards		INT 10 x 100 yards
Lift	Upper	Lower			Upper	Lower
Calisthenics		X	X	X		X
Core	X		X	X	X	
Flexibility	X	X	X	X	X	X

Table 7 Weekly Training Schedule (Increased LSD Sessions)

Strong in one thing; weak in another

If you have unbalanced fitness – you are clearly slower in either running or swimming – you should devote a greater percentage of your training to improve the slower activity. SEAL candidates with a swim time slower than 10:35 or a run time slower than 10:38, while performing moderately or well in the other activity, should focus more attention on the slower event. **Table 8** is an example of a schedule weighted toward improving a slower swimmer. A strong swimmer with limited running ability would reverse the schedule. ■

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Run		INT			LSD	
Swim	LSD		CHI	LSD		INT
Lift		Upper	Lower		Upper	Lower
Calisthenics	X		X	X		X
Core	X	X		X	X	
Flexibility	X	X	X	X	X	X

Table 8 Weekly Training Schedule For A Slow Swimmer

Keep a record of your training. You will see your progress and have a history to show to a mentor or coach. A tangible record of your performances allows you to establish specific goals and can increase your motivation to train. Training records make it easier to avoid training mistakes or recognize potential problems before they become serious. Record basic information such as time and distance for running and swimming workouts (including individual times for each interval during interval workouts); number of reps of calisthenics and core exercises; and details of strength workouts (exercises, sets, reps, and amount of weight lifted). You may also choose to record more detailed information such as notes about your diet, the environment (temperature, humidity, wind), psychological state of mind (relaxed, anxious, energized, listless), amount of sleep, persistent soreness or any other variable that might affect your training. ■

Long Physical Training Guide

THE NAVAL SPECIAL WARFARE PHYSICAL TRAINING GUIDE

Produced by: The Naval Special Warfare Center

The Naval Special Warfare Physical Training Guide (PTG) is a tailored 26 week training program designed specifically to help you develop the strength and endurance to withstand the rigors of SEAL Basic Underwater Demolition/SEAL (BUD/S) or SWCC Basic Crewman Training (BCT), and the Navy SEAL or SWCC Physical Screening Test (PST). The PTG was created by the Naval Special Warfare Center and the Naval Special Warfare Preparatory School.

.PRACTICING THE PST

If you are preparing for the PST, you should occasionally do a practice or mock PST. Simulate actual PST conditions as much as possible, including recovery periods between events and strict standards of performance. Fine-tune your nutrition and warm-up strategies. Optimize your pacing to get the overall best results. You might use results to adjust your training paces and reps for run, swim, and push-sit-pull workouts. Do not practice too often. Every 4-6 weeks should be sufficient.

You want to give your body a chance to adapt to training before you test, and you don't want to disrupt your normal training schedule too often. Choose a day for a mock PST and determine how to modify your other workouts for the week. There is no perfect way to do this but one suggestion is to do the mock PST on a day you normally do your Long Interval workout for running or swimming. You might shorten your workouts the day before (e.g., LSD) so you are not too tired. Tapering improves performance but different people respond best to different tapers, so that is something else to figure out as you practice. After several weeks of training and a couple of mock PSTs, you should have a pretty good idea of where you are, what you need to work on most, and how ready you are for an actual PST.

.GENERAL TRAINING GUIDLINES

Key points to training

1. Keep it simple
2. Use proper technique (get coaching from qualified sources if necessary)
3. Develop the whole body, especially the parts known to be vulnerable to injury

Your workouts should be

1. Planned, structured, organized
2. Balanced and well-rounded
3. Applied gradually and consistently
4. Specific to the demands of BUD/S or BCT

The Naval Special Warfare Physical Training Guide is designed to assist anyone who wants to improve fitness in order to take and pass the Physical Screening Test (PST) and succeed at Basic Underwater Demolition/SEAL (BUD/S) or Basic Crewman Training (BCT).

This PTG provides information about the type of training required to properly prepare for the rigors of BUD/S or BCT, and it offers a training template that will help a person with average fitness train effectively and minimize the risk of injury. A 26-week example is provided, but the template can be modified to suit individual needs and extended indefinitely.

Most of your cardiovascular exercise should focus on running and swimming. Resistance training targeting the whole body should be performed to develop the optimal muscular strength and endurance to resist injury and succeed at BUD/S or BCT. Specific emphasis on push-ups, sit-ups, and pull-ups will be necessary to achieve the required standards for the PST. Cross-training such as cycling, rowing, or hiking will complement and supplement your basic training. Work to achieve balanced fitness, with the optimal combination of endurance, strength, mobility, and flexibility. Work to improve your unsatisfactory qualities, and don’t just focus on the things you're good at.

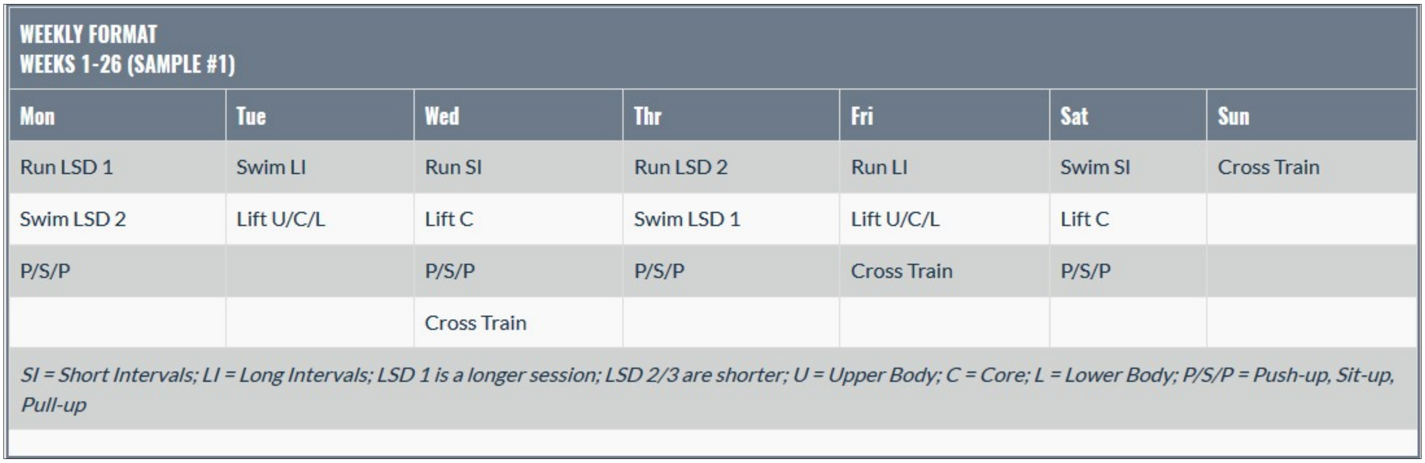
Weekly workout summary

1. 2 Long Slow Distance workouts for both running and swimming
2. 1 Long Interval workout for both running and swimming
3. 1 Short Interval workout for both running and swimming
4. 2 Strength Training Sessions for upper body, core, and lower body
5. Multiple stretching/flexibility sessions
6. Focus on injury resistance
7. Occasional cross-training

.26 WEEK TRAINING SCHEDULE

The weekly format tables provide samples of how you might arrange your weekly training schedule to combine all workouts for the first 26 weeks as well as for longer periods (even several years). You want to create balance considering how different workouts may interfere with each other, but results vary among different trainees so construct a schedule that works for you. If you run and swim on the same day, you can do either one first. If you lift weights on a day you run or swim, you can lift before or after running or swimming.

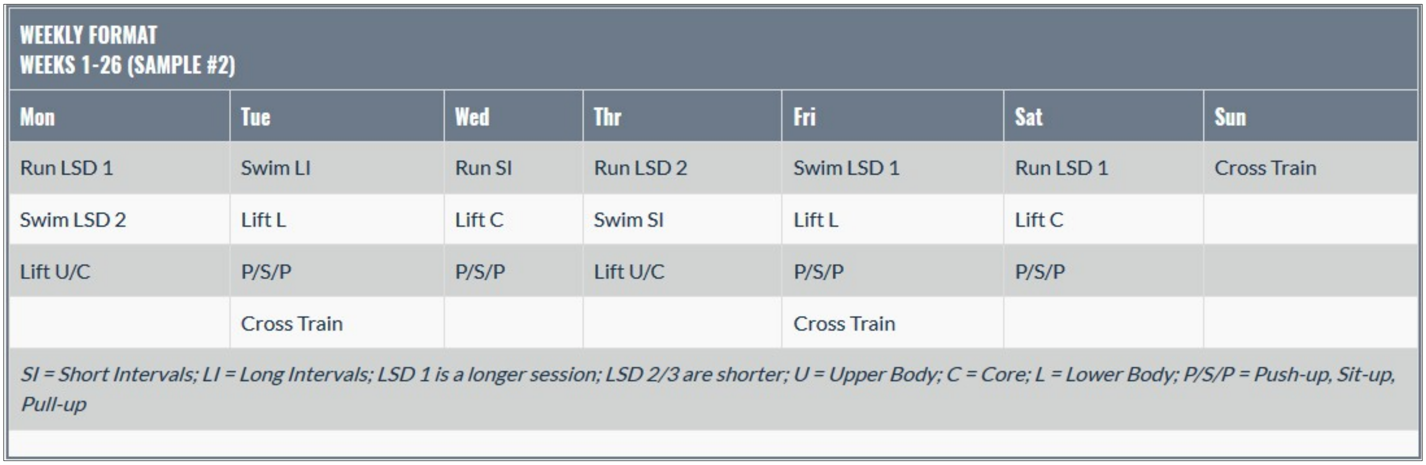
It may be preferable to split a day into morning and afternoon/evening sessions to allow better recovery, but if that is not practical, do a single session. Worry more about completing your workouts every week rather than worrying about the exact schedule. Over time, make adjustments if necessary to the days you do specific workouts, but keep following the general progressions for increasing your running, swimming, lifting, and calisthenics. Maintain your commitment to train as effectively as possible to prepare for entering the SEAL or SWCC pipeline.



WEEKLY FORMAT
WEEKS 1-26 (SAMPLE #1)

Mon	Tue	Wed	Thr	Fri	Sat	Sun
Run LSD 1	Swim LI	Run SI	Run LSD 2	Run LI	Swim SI	Cross Train
Swim LSD 2	Lift U/C/L	Lift C	Swim LSD 1	Lift U/C/L	Lift C	
P/S/P		P/S/P	P/S/P	Cross Train	P/S/P	
		Cross Train				

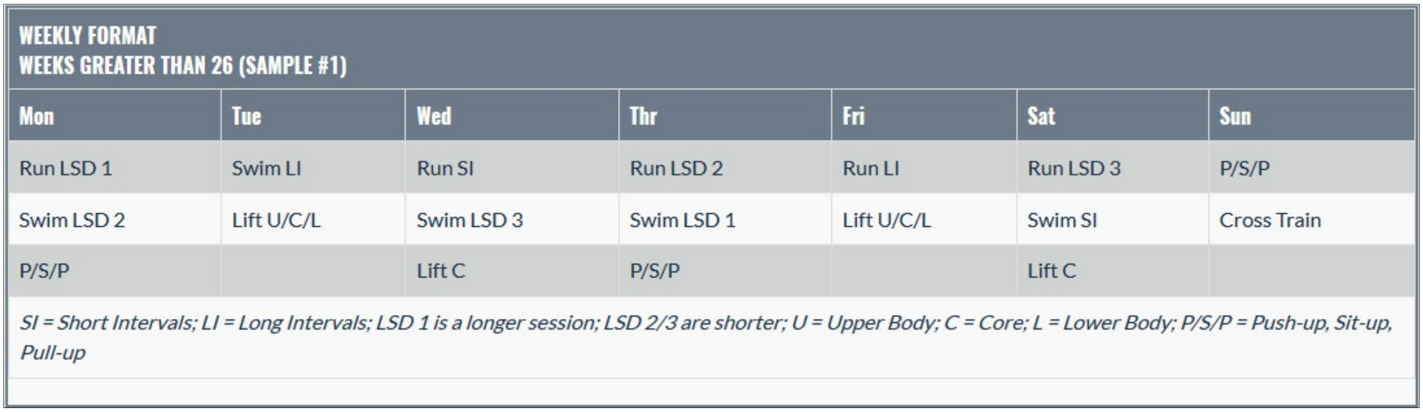
SI = Short Intervals; LI = Long Intervals; LSD 1 is a longer session; LSD 2/3 are shorter; U = Upper Body; C = Core; L = Lower Body; P/S/P = Push-up, Sit-up, Pull-up



WEEKLY FORMAT
WEEKS 1-26 (SAMPLE #2)

Mon	Tue	Wed	Thr	Fri	Sat	Sun
Run LSD 1	Swim LI	Run SI	Run LSD 2	Swim LSD 1	Run LSD 1	Cross Train
Swim LSD 2	Lift L	Lift C	Swim SI	Lift L	Lift C	
Lift U/C	P/S/P	P/S/P	Lift U/C	P/S/P	P/S/P	
	Cross Train			Cross Train		

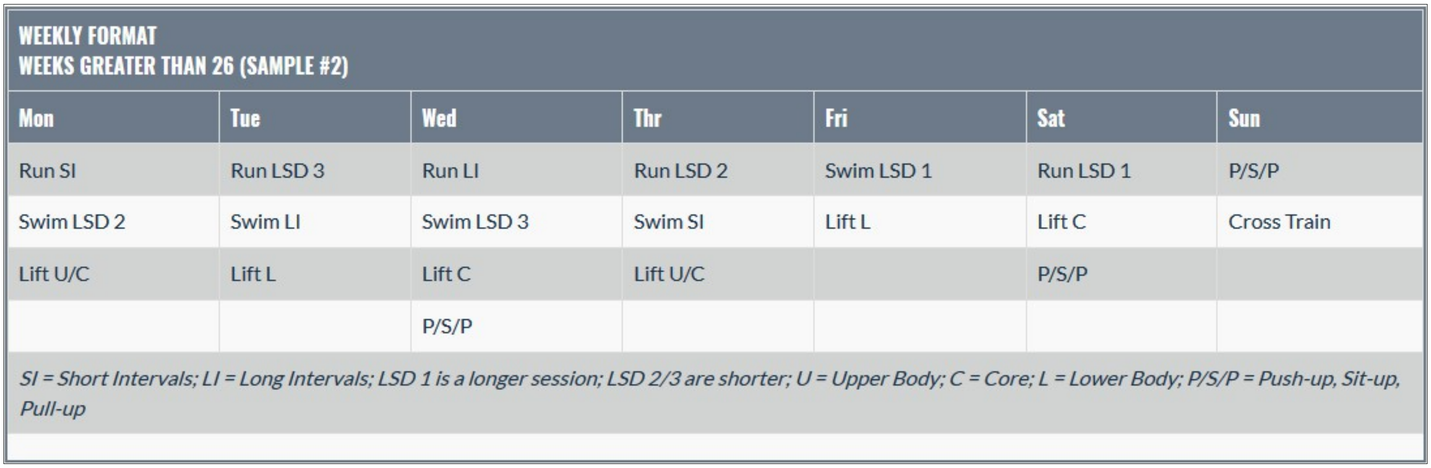
SI = Short Intervals; LI = Long Intervals; LSD 1 is a longer session; LSD 2/3 are shorter; U = Upper Body; C = Core; L = Lower Body; P/S/P = Push-up, Sit-up, Pull-up



WEEKLY FORMAT
WEEKS GREATER THAN 26 (SAMPLE #1)

Mon	Tue	Wed	Thr	Fri	Sat	Sun
Run LSD 1	Swim LI	Run SI	Run LSD 2	Run LI	Run LSD 3	P/S/P
Swim LSD 2	Lift U/C/L	Swim LSD 3	Swim LSD 1	Lift U/C/L	Swim SI	Cross Train
P/S/P		Lift C	P/S/P		Lift C	

SI = Short Intervals; LI = Long Intervals; LSD 1 is a longer session; LSD 2/3 are shorter; U = Upper Body; C = Core; L = Lower Body; P/S/P = Push-up, Sit-up, Pull-up



WEEKLY FORMAT
WEEKS GREATER THAN 26 (SAMPLE #2)

Mon	Tue	Wed	Thr	Fri	Sat	Sun
Run SI	Run LSD 3	Run LI	Run LSD 2	Swim LSD 1	Run LSD 1	P/S/P
Swim LSD 2	Swim LI	Swim LSD 3	Swim SI	Lift L	Lift C	Cross Train
Lift U/C	Lift L	Lift C	Lift U/C		P/S/P	
		P/S/P				

SI = Short Intervals; LI = Long Intervals; LSD 1 is a longer session; LSD 2/3 are shorter; U = Upper Body; C = Core; L = Lower Body; P/S/P = Push-up, Sit-up, Pull-up

.WORKOUTS

Warm-up (WU), Active Recovery (AR) and Cool-down (CD)

Every workout should begin with a warm-up. Even for LSD workouts, where the intensity will be moderate, you should spend several minutes specifically preparing to improve the quality of the workout. Include some dynamic stretching, some easy jogging or swimming, and even some bursts of speed. For Interval sessions, your warm-up should be long and thorough. Your total warm-up distance may be as great as the total distance you cover during the work intervals (2-4 miles for running and 800-1600 yards for swimming). Include dynamic stretching, drills, easy jogging or swimming, and several high-intensity bursts of speed that last 30 seconds or longer.

For Interval training, the time spent between work intervals must include active recovery. Spend at least half the recovery time jogging/walking briskly or swimming easily. This will maintain blood flow to the muscles, deliver oxygen and nutrients and remove waste, allowing you to perform at higher intensity during the work periods.

After your workout, include a cool-down period. This means a few minutes of easy jogging or swimming after LSD sessions, and more extended work to gradually return to baseline after an intense interval session. For cool-down, you may choose to do a cross-training activity like cycling instead of running or swimming. Your total distance of warm-up, cool-down, and active recovery for all workouts may be 1/3 to 1/2 of your total training distance so it is important to give these aspects proper consideration and perform them with as much attention to detail as the actual workouts. The tables below provide a sample of how your total run and swim distances (all workouts) might gradually increase over several weeks.

Long Slow Distance (LSD)

The intensity of LSD work is low to moderate, so your pace should feel somewhat relaxed. These workouts build endurance and provide relative recovery between more intense sessions. To determine the appropriate intensity, use the Talk Test. You should be able to talk comfortably in short sentences while training, drawing breath between phrases. If you can't speak, you are working too hard, and if you can speak continually, you are not working hard enough.

For LSD workouts, focus more on duration than intensity. Forty minutes of continual running or swimming is typical. A beginner may need to start at twenty minutes, and someone who is very fit might perform 90 minutes of continuous movement in one session. A practical goal is to build up to comfortably running 8-10 miles or swimming 1.5-2 miles without stopping.

On a weekly basis, try to perform two LSD sessions for running and swimming. Make one a longer session and the other a shorter session, but keep the pace about the same (don't try to go much harder on the shorter session because it is shorter. There are Interval sessions for higher intensity). It is possible to do more than two LSD sessions for running or swimming or both, but that should come after many weeks of training. To sustain long term improvement and avoid injury, it is important to start with a modest training volume and then gradually but consistently add mileage/yardage. It has been suggested that total work be increased no more than 10% per week. Think of that as a maximum, with 5-8% being more ideal.

Long Intervals (LI)

The two tables below provide sample schedules for Long Interval running and swimming workouts over 26 weeks. You can follow the schedules exactly as they are or modify them to suit your needs, as long as you follow the same basic structure and are careful not to increase your total mileage/yardage too quickly or your intensity too severely. Beyond 26 weeks, don't increase the amount of Interval Training (you can still work on getting faster). You can add more LSD work if appropriate, or add more cross training.

These sessions typically involve up to 30 minutes of total work (not including recovery) in 1-4 intervals. These intervals typically involve moving for approximately 7-20 minutes without stopping at a pace approximately 90-95% of the maximal pace you could hold for that duration.

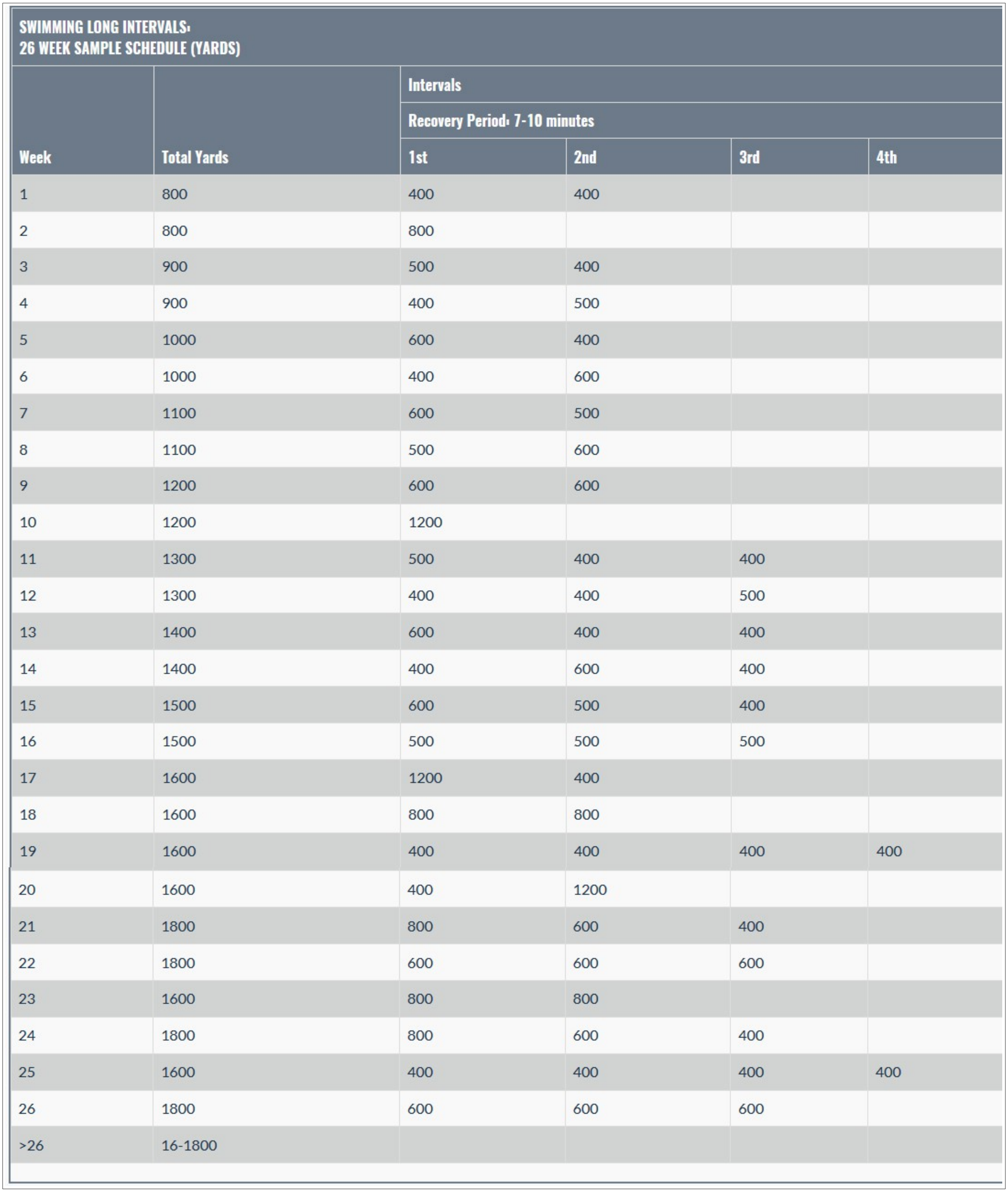
Here is a simple example for running. If you can run 1.5 miles in 9:00 (6:00/mile pace), your LI running workouts would be around 6:20-6:40/mile pace. The workout should be very demanding but not totally exhausting. On a scale of 1-10, with 10 being the greatest effort possible, the workout should feel like 8-9. If you are not sure what your pace should be, don't overthink it. Work hard and try to get faster over time.

A good place to start for Long Interval workouts is 2 x 1 mile for running and 2 x 400 yards for swimming. Over several weeks, increase the total work to 4-4.5 miles (running) and 16-1800 yards (swimming). Use different combinations of total intervals (1-4) of various lengths: 1, 1.25, 1.5, 2, or 3 miles for running and 400, 500, 600, 800, and 1200 yards for swimming. When performing more than one repetition, allow sufficient recovery between repetitions so you can maintain the desired intensity of 90-95% of maximal pace.

A reasonable recovery period is generally 7-10 minutes, depending on how long or intense the work period is. During this time, use active recovery: keep moving at a low intensity (slow jog or brisk walk for running or an easy stroke for swimming). Come to a complete stop only long enough to get a drink, stretch, etc.

RUNNING LONG INTERVALS:
26 WEEK SAMPLE SCHEDULE (MILES)

		Intervals			
		Recovery Period: 7-10 minutes			
Week	Total Miles	1st	2nd	3rd	4th
1	2	1	1		
2	2	2			
3	2.25	1.25	1		
4	2.25	1	1.25		
5	2.5	1.5	1		
6	2.5	1	1.5		
7	2.75	1.5	1.25		
8	2.75	1.25	1.5		
9	3	1.5	1.5		
10	3	3			
11	3.25	1.25	1	1	
12	3.25	1	1	1.25	
13	3.5	1.5	1	1	
14	3.5	1	1.5	1	
15	3.75	1.5	1.25	1	
16	3.75	1.25	1.25	1.25	
17	4	3	1		
18	4	2	2		
19	4	1	1	1	1
20	4	1	3		
21	4.5	2	1.5	1	
22	4.5	1.5	1.5	1.5	
23	4	2	2		
24	4.5	2	1.5	1	
25	4	1	1	1	1
26	4.5	1.5	1.5	1.5	
>26	4-4.5				



SWIMMING LONG INTERVALS:
26 WEEK SAMPLE SCHEDULE (YARDS)

		Intervals			
		Recovery Period: 7-10 minutes			
Week	Total Yards	1st	2nd	3rd	4th
1	800	400	400		
2	800	800			
3	900	500	400		
4	900	400	500		
5	1000	600	400		
6	1000	400	600		
7	1100	600	500		
8	1100	500	600		
9	1200	600	600		
10	1200	1200			
11	1300	500	400	400	
12	1300	400	400	500	
13	1400	600	400	400	
14	1400	400	600	400	
15	1500	600	500	400	
16	1500	500	500	500	
17	1600	1200	400		
18	1600	800	800		
19	1600	400	400	400	400
20	1600	400	1200		
21	1800	800	600	400	
22	1800	600	600	600	
23	1600	800	800		
24	1800	800	600	400	
25	1600	400	400	400	400
26	1800	600	600	600	
>26	16-1800				

Short Intervals (SI)

The two tables below provide sample schedules for Short Interval running and swimming workouts over 26 weeks. You can follow the schedules exactly as they are or modify them to suit your needs, as long as you follow the same basic structure and are careful not to increase your total mileage/yardage too quickly or your intensity too severely. Beyond 26 weeks, don't increase the amount of Interval Training (you can still work on getting faster). You can add more LSD work if appropriate, or add more cross training. These sessions alternate short, intense work intervals with periods of recovery.

Typical formats include running 400m (1/4 mile) repeats or swimming 100-yard repeats, allowing a recovery period of 2-2.5 times the amount of time it takes to perform the work interval. Initially, your intensity or pace should be slightly faster than the pace of your most recent 1.5-mile run or 500-yard swim. For running, your 400m interval pace should be about 4 seconds faster than your base pace, and for swimming, your 100-yard interval pace should be 2 seconds faster than your base.

For example, if you recently completed a 1.5-mile run in 10:30 (1:45 per 400m or 1/4 mile), your SI training pace should be about 1:41 per 400m. If you completed a 500-yard swim in 10:30 (2:06 per 100 yards), your SI intervals should be approximately 2:04 per 100yds. These are just estimated paces to get you started, and probably won't seem very difficult for only four intervals. As your fitness and experience improve, you can go faster.

Your first Short Interval workout should consist of 4 repeats, and build progressively toward completing 8 intervals. Do not run or swim more than 8 intervals during a Short Interval session. When you can complete all 8 intervals at high intensity, work on gradually performing the intervals a little faster each week. Work on consistency, trying to keep little variation between your fastest and slowest interval and pacing yourself to be fastest at the end of the workout.

A note on interval variations

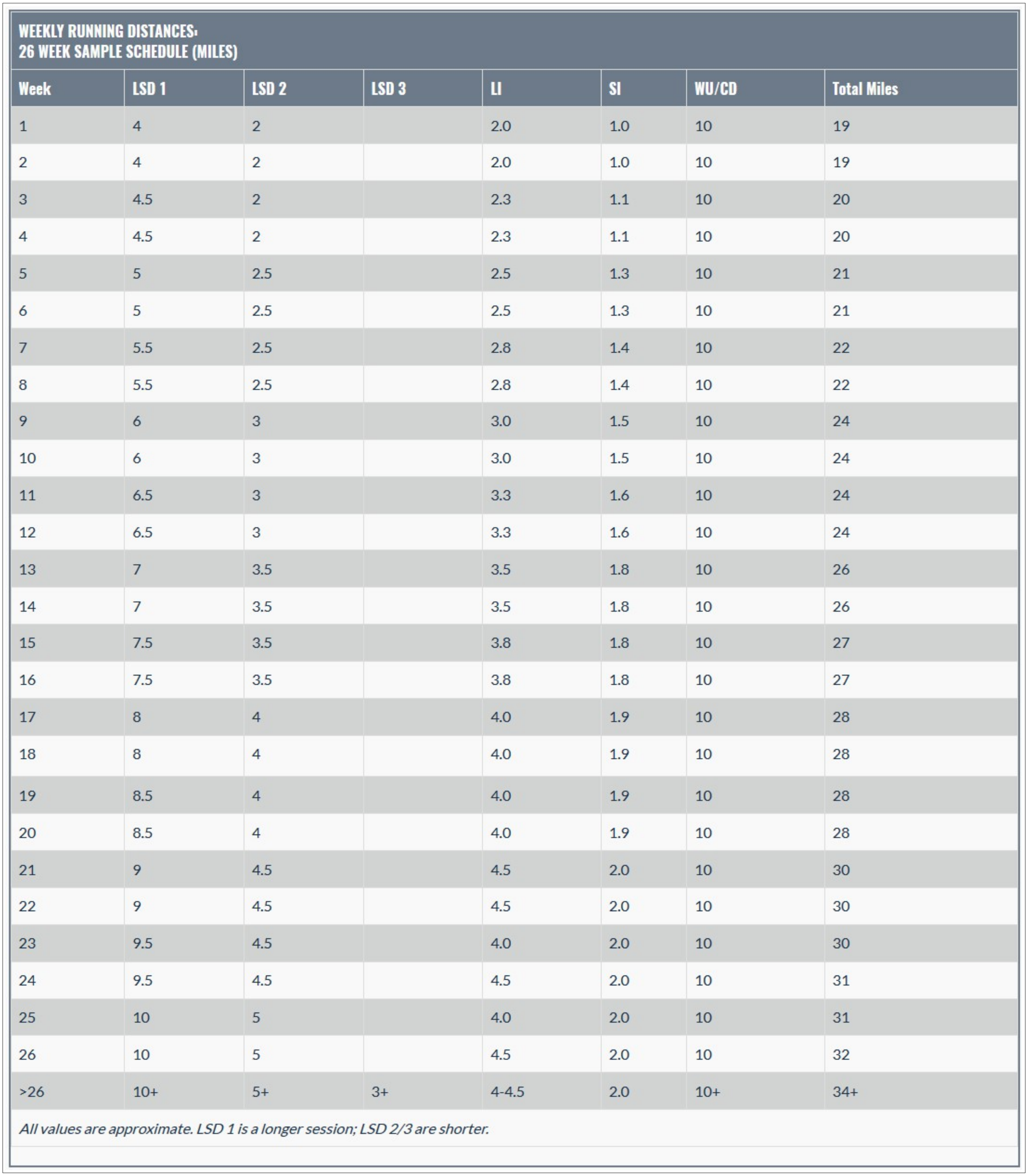
For variety, you can change the interval length for different workouts. For running, instead or in addition to 400m (1/4-mile) intervals, use 200m, 300m, 600m, or 800m intervals. For swimming, supplement 100-yard intervals with 50-, 75-, 150-, or 200-yard intervals. Use any combination (they don't have to be all the same) that add up to no more than 3200m (2 miles) for running and 800 yards for swimming. Allow enough recovery time after each interval to maintain the proper work intensity (2-2.5 x the work time). To promote faster, more complete recovery, use active recovery.

RUNNING SHORT INTERVALS:
26 WEEK SAMPLE SCHEDULE (METERS)

Week	Total Meters	Intervals							
		Recovery Period: 2-2.5 x the work time							
		1st	2nd	3rd	4th	5th	6th	7th	8th
1	1600	400	400	400	400				
2	1600	200	400	400	400	200			
3	1800	400	400	400	200	200	200		
4	1800	200	400	600	400	200			
5	2000	400	400	400	400	400			
6	2000	600	400	400	200	200	200		
7	2200	400	400	400	400	200	200	200	
8	2200	600	400	400	400	200	200		
9	2400	400	400	400	400	400	400		
10	2400	600	600	300	300	300	300		
11	2600	400	400	400	400	400	200	200	200
12	2600	200	600	200	600	200	600	200	
13	2800	400	400	400	400	400	400	400	
14	2800	800	400	400	300	300	300	300	
15	2800	600	600	600	400	400	200		
16	2800	400	600	800	600	400			
17	3000	600	400	400	400	300	300	300	300
18	3000	600	600	600	600	600			
19	3000	300	300	300	600	600	300	300	300
20	3000	800	600	400	300	300	300	300	
21	3200	400	400	400	400	400	400	400	400
22	3200	400	400	800	800	400	400		
23	3200	400	400	400	400	400	400	400	400
24	3200	200	400	600	800	600	400	200	
25	3200	800	800	800	800				
26	3200	400	400	400	400	400	400	400	400
>26	3200								

SWIMMING SHORT INTERVALS:
26 WEEK SAMPLE SCHEDULE (YARDS)

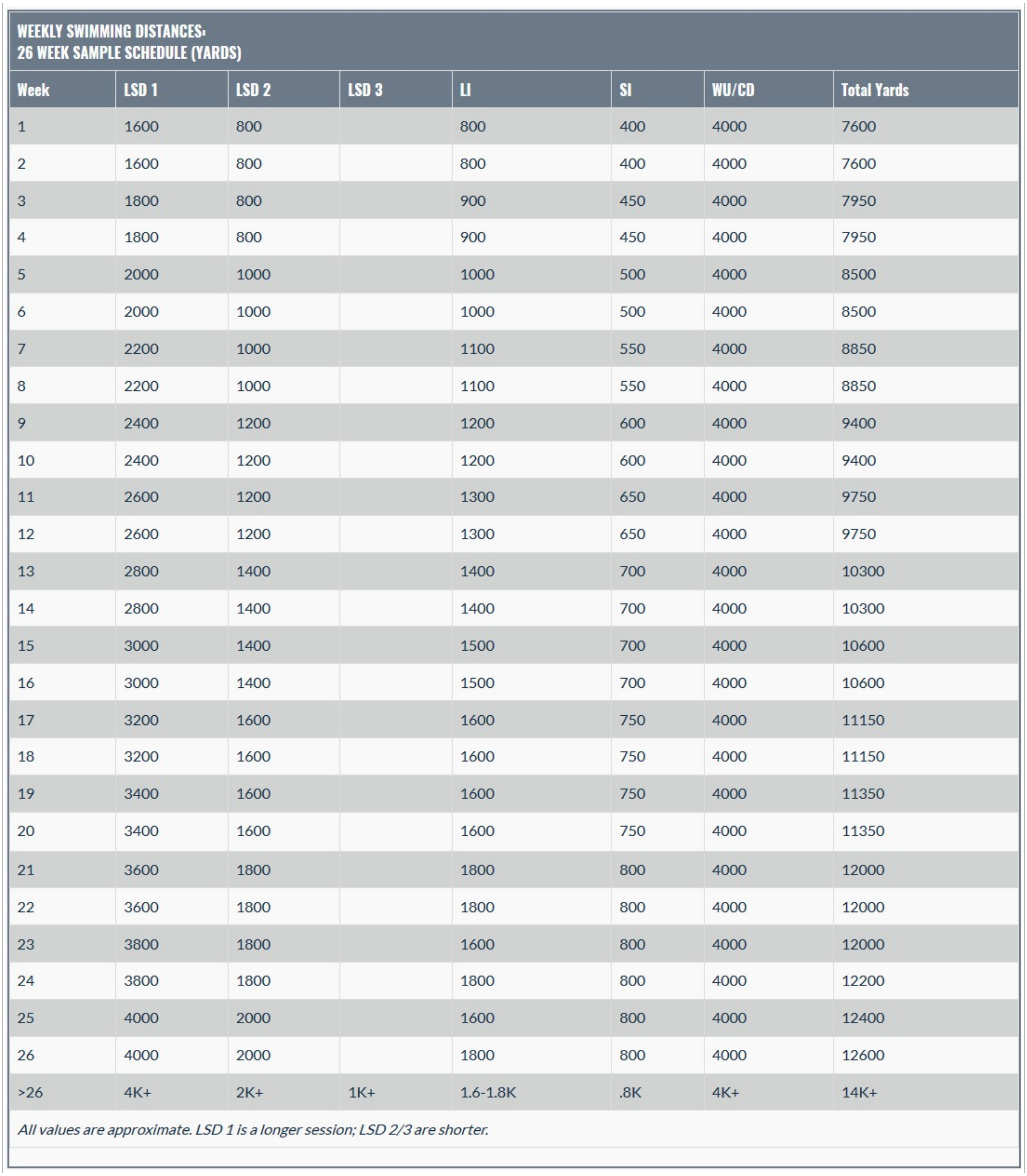
Week	Total Yards	Intervals							
		Recovery Period: 2-2.5 x the work time							
		1st	2nd	3rd	4th	5th	6th	7th	8th
1	400	100	100	100	100				
2	400	50	100	100	100	50			
3	450	100	100	100	50	50	50		
4	450	50	100	150	100	50			
5	500	100	100	100	100	100			
6	500	150	100	100	50	50	50		
7	550	100	100	100	100	50	50	50	
8	550	150	100	100	100	50	50		
9	600	100	100	100	100	100	100		
10	600	150	150	75	75	75	75		
11	650	100	100	100	100	100	50	50	50
12	650	50	150	50	150	50	150	50	
13	700	100	100	100	100	100	100	100	
14	700	200	100	100	75	75	75	75	
15	700	150	150	150	100	100	50		
16	700	100	150	200	150	100			
17	750	150	100	100	100	75	75	75	75
18	750	150	150	150	150	150			
19	750	75	75	75	150	150	75	75	75
20	750	200	150	100	75	75	75	75	
21	800	100	100	100	100	100	100	100	100
22	800	100	100	200	200	100	100		
23	800	100	100	100	100	100	100	100	100
24	800	50	100	150	200	150	100	50	
25	800	200	200	200	200				
26	800	100	100	100	100	100	100	100	100
>26	800								



WEEKLY RUNNING DISTANCES:
26 WEEK SAMPLE SCHEDULE (MILES)

Week	LSD 1	LSD 2	LSD 3	LI	SI	WU/CD	Total Miles
1	4	2		2.0	1.0	10	19
2	4	2		2.0	1.0	10	19
3	4.5	2		2.3	1.1	10	20
4	4.5	2		2.3	1.1	10	20
5	5	2.5		2.5	1.3	10	21
6	5	2.5		2.5	1.3	10	21
7	5.5	2.5		2.8	1.4	10	22
8	5.5	2.5		2.8	1.4	10	22
9	6	3		3.0	1.5	10	24
10	6	3		3.0	1.5	10	24
11	6.5	3		3.3	1.6	10	24
12	6.5	3		3.3	1.6	10	24
13	7	3.5		3.5	1.8	10	26
14	7	3.5		3.5	1.8	10	26
15	7.5	3.5		3.8	1.8	10	27
16	7.5	3.5		3.8	1.8	10	27
17	8	4		4.0	1.9	10	28
18	8	4		4.0	1.9	10	28
19	8.5	4		4.0	1.9	10	28
20	8.5	4		4.0	1.9	10	28
21	9	4.5		4.5	2.0	10	30
22	9	4.5		4.5	2.0	10	30
23	9.5	4.5		4.0	2.0	10	30
24	9.5	4.5		4.5	2.0	10	31
25	10	5		4.0	2.0	10	31
26	10	5		4.5	2.0	10	32
>26	10+	5+	3+	4-4.5	2.0	10+	34+

All values are approximate. LSD 1 is a longer session; LSD 2/3 are shorter.



WEEKLY SWIMMING DISTANCES:
26 WEEK SAMPLE SCHEDULE (YARDS)

Week	LSD 1	LSD 2	LSD 3	LI	SI	WU/CD	Total Yards
1	1600	800		800	400	4000	7600
2	1600	800		800	400	4000	7600
3	1800	800		900	450	4000	7950
4	1800	800		900	450	4000	7950
5	2000	1000		1000	500	4000	8500
6	2000	1000		1000	500	4000	8500
7	2200	1000		1100	550	4000	8850
8	2200	1000		1100	550	4000	8850
9	2400	1200		1200	600	4000	9400
10	2400	1200		1200	600	4000	9400
11	2600	1200		1300	650	4000	9750
12	2600	1200		1300	650	4000	9750
13	2800	1400		1400	700	4000	10300
14	2800	1400		1400	700	4000	10300
15	3000	1400		1500	700	4000	10600
16	3000	1400		1500	700	4000	10600
17	3200	1600		1600	750	4000	11150
18	3200	1600		1600	750	4000	11150
19	3400	1600		1600	750	4000	11350
20	3400	1600		1600	750	4000	11350
21	3600	1800		1800	800	4000	12000
22	3600	1800		1800	800	4000	12000
23	3800	1800		1600	800	4000	12000
24	3800	1800		1800	800	4000	12200
25	4000	2000		1600	800	4000	12400
26	4000	2000		1800	800	4000	12600
>26	4K+	2K+	1K+	1.6-1.8K	.8K	4K+	14K+

All values are approximate. LSD 1 is a longer session; LSD 2/3 are shorter.

.SPECIAL CONSIDERATIONS

Running

1. Try to do interval training on a measured course, such as a running track. If that is not possible, find a location with a firm, flat surface without traffic that is safe for fast running.
2. Try to do LSD running on a variety of different surfaces or terrains: flat, hilly, firm, and soft – pavement, trails, grass, beaches, even snow.
3. Don't worry about wearing boots when running. If you do run in boots, run only a couple miles a week.

Swimming

1. A pool is desirable for interval training.
2. Take every safety precaution if you train in open water (lake or ocean)
3. Mix free style swimming into your workouts in addition to the Combat Side Stroke. This will increase intensity and promote fitness that will translate to faster CSS swimming. Perform as much as one third of your training using free style, mixed into interval and LSD workouts.
4. Be careful if you include swimming with fins as part of your training. Make sure your ankles are strong and flexible first. About 1000 yards per week with fins is sufficient.

Cross Training

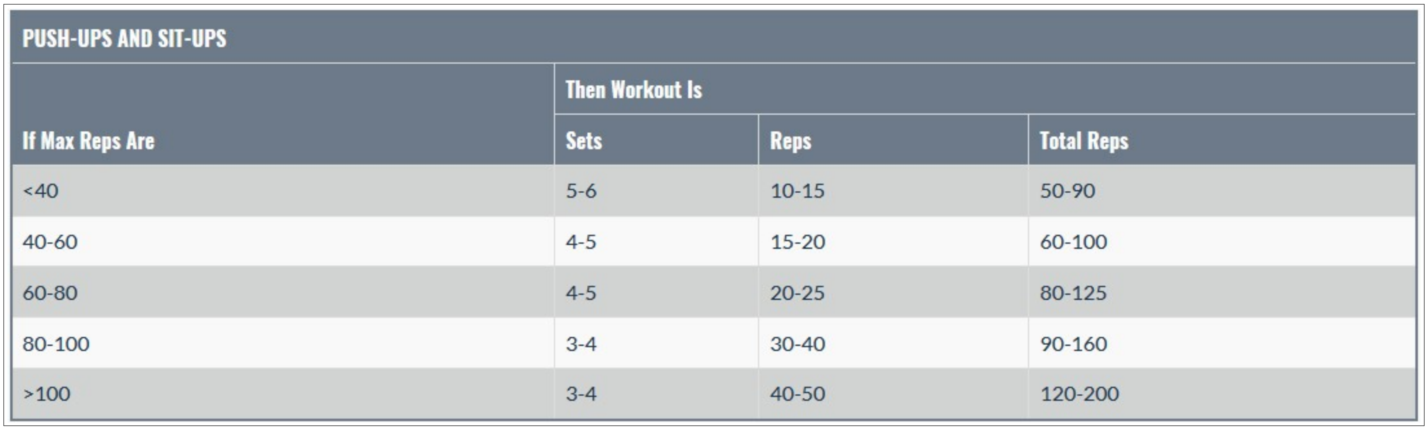
1. You can supplement your run and swim training with cross-training using other cardiovascular activities. Appropriate activities use large muscles and can be performed rhythmically and continuously. Examples include (but are not limited to) cycling, rowing, stair stepping, elliptical machines, and hiking.
2. Use cross-training activities to help build your conditioning base without overtraining (since you don't want to ramp up your running or swimming volume too quickly). Use cross-training to inject a little variety into your routine.
3. When necessary, substitute cross-training for running or swimming. This might happen if you have a minor injury, there is bad weather, or your regular training facility is not available.

.PUSH-UPS, SIT-UPS, AND PULL-UPS

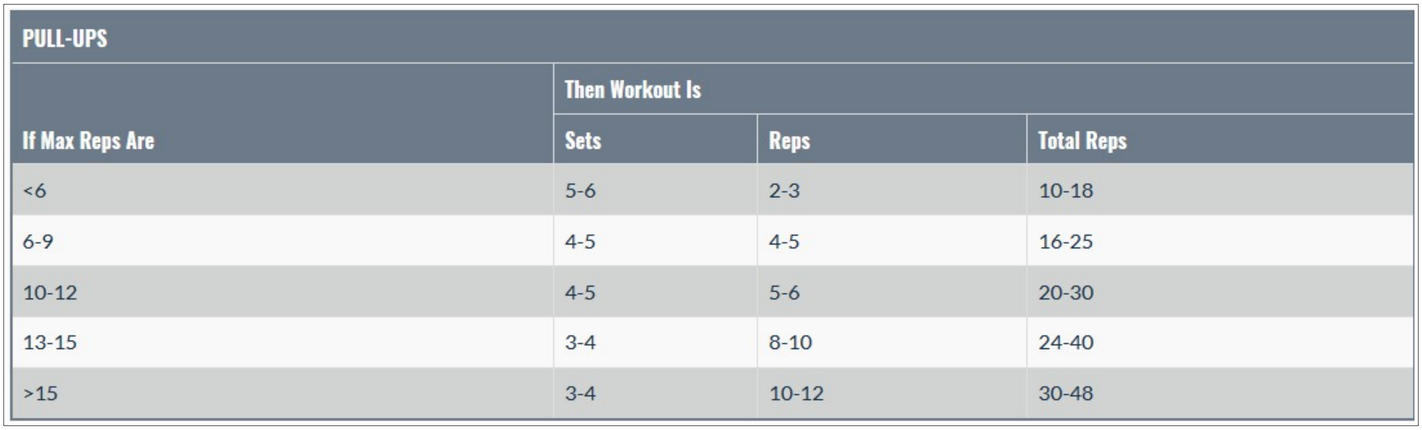
The PST requires you to give maximal effort to perform as many push-ups, sit-ups, and pull-ups as possible in two minutes. This specific performance requires specific preparation (dedicated training to improve max reps for these exercises). The Physical Training Guide emphasizes the importance of balanced training, developing the whole body (upper, core, lower) and training opposing muscle groups equally (push-pull). While it is necessary to focus on push-ups, sit-ups, and pull-ups for the PST, be aware that this may contribute to muscle imbalances that affect the injury risk of BUD/S and BCT candidates. It is important to be economical and efficient when training for push-ups, sit-ups, and pull- ups to avoid overtraining and creating imbalances. A good rule of thumb is to perform no more than 200 push-ups or sit-ups and no more than 50 pull-ups in a single day, and no more than 1000 push-ups or sit- ups and no more than 250 pull-ups in a week.

Practical performance goals for the PST are about 100 push-ups and sit-ups and about 20 pull-ups. The basic training method is to start with several small sets and gradually progress towards fewer, larger sets. The total reps will gradually increase, but not beyond the upper limit per day.Recover enough between sets to maintain quality repetitions. Over time, reduce the recovery between sets, without reducing the quality of reps. The push-up, sit-up and pull-up tables provide a specific training matrix based on your current max. The PST requires fast reps, so occasionally (about once a week) practice doing push-ups, sit-ups, and pull-ups as if you are doing the PST. Determine your current max for each exercise. Work on the rhythm and pacing that will produce your best PST score. Make sure to review the current standards for acceptable technique so all your reps will count when taking the PST.

For the majority of training, follow the guidelines for push-ups, sit-ups, and pull-ups provided below in the Physical Training Guide. This involves moving with control through a full range of motion and emphasizing the eccentric (negative) portion. While it may not be obvious, this will improve your ability to perform the PST, and will also enhance your ability to perform other tasks in BUD/S or BCT and increase your resistance to injury. Focus on progressing through the matrix in the table below with high-quality repetitions.



PUSH-UPS AND SIT-UPS			
	Then Workout Is		
If Max Reps Are	Sets	Reps	Total Reps
<40	5-6	10-15	50-90
40-60	4-5	15-20	60-100
60-80	4-5	20-25	80-125
80-100	3-4	30-40	90-160
>100	3-4	40-50	120-200



PULL-UPS			
	Then Workout Is		
If Max Reps Are	Sets	Reps	Total Reps
<6	5-6	2-3	10-18
6-9	4-5	4-5	16-25
10-12	4-5	5-6	20-30
13-15	3-4	8-10	24-40
>15	3-4	10-12	30-48

.STRENGTH TRAINING

Success in BUD/S and BCT requires a certain amount of strength (though strength does has less effect on success than running or swimming ability). Strength is necessary to perform demanding evolutions during the selection pipeline as well as remain resistant to injury. Developing an effective strength program involves targeting the whole body (upper, core, lower); maintaining balance across opposing muscle groups (push-pull); and targeting muscles known to affect injury risk (including rotator cuff, hamstrings, and torso rotators). Many different programs and methods have been used to improve strength.

Follow these basic recommendations

Keeping in mind the specific needs of BUD/S and BCT, and the necessity of emphasizing running and swimming during preparation:

1. Use different forms of resistance, including body weight, free weights, and machines
2. Select exercises that target the whole body (upper, core, lower); that create movement in all three planes; that balance opposing muscles (push-pull)
3. Perform movements in a controlled manner through a full Range of Motion (ROM) using proper technique; emphasize negative (eccentric) contractions

It is not necessary to perform multiple sets of each exercise to realize significant gains in strength. One set to momentary muscle failure is generally sufficient. This also leaves time for more exercises to target the whole body. The weight and number of repetitions is not critical, as long as momentary muscle failure is reached. This means completing as many reps as possible with proper form. When you become too fatigued to do another repetition without sacrificing technique, put the weight down. Generally choose a weight you can lift 8-12 times with proper form before failure. On different days for different exercises, choose heavier weight so you finish in fewer reps (4-6), or lighter weight so you finish with more reps (15 or even 20). Changing the weight and reps periodically will increase overall strength under different conditions. Over time, you will be able to lift a given weight for more reps. Here is a hypothetical example of how you might perform an exercise such as the overhead dumbbell press over several workouts: 8x45lbs, 10x40lbs, 6x50lbs, 9x45lbs, 11x40lbs, 7x50lbs, etc. Your actual numbers may vary from this example but in general you do more reps with lighter weights (or fewer reps with heavier weights) as you work towards momentary muscle failure.

During a workout, move from one exercise to the next efficiently. Recover as necessary, but don’t waste time. By the same token, don’t race. Perform each exercise with the best technique possible. Do the exercises in any order, but alternate between pushing and pulling.

Mix up the order for different workouts on different days. Choose different variations (different forms of resistance) for the same basic movement on different days for different workouts (such as machine chest press one day and dumbbell press another). A whole-body workout should be completed in an hour or less. The entire body can be trained in a single session 2-3x per week, or different regions (upper, core, lower) can be trained separately on different days depending on the time you have or if you want to coordinate strength training with running or swimming. It is possible to do strength training daily as long as each region/muscle group gets 2-3 days of recovery between sessions. Train each region no less than 1x and no more than 3x per week, with the exception of Core. Core exercises such as planks, side plank, and bridge can and should be performed more frequently (4-6x per week).

Training the whole body in one session or by different regions on different days will provide similar results, so the choice is yours depending on what fits your schedule best. There are advantages and disadvantages to strength training before or after a running or swimming workout, so once again do whatever fits your schedule best.

Candidates have asked what will be the effect of combining heavy weights for exercises like bench press or lat pull-downs with many sets of push-ups and pull-ups. Will this cause overtraining? This should not be a problem if the basic recommendations for limiting strength training (weight lifting) to twice per week and calisthenics numbers are kept within the suggested ranges.

Important things to remember when creating a strength workout:

1. Choose exercises for the upper body, trunk, and lower body
2. Choose exercises that create movement in all three planes
3. Choose exercises that create balance (push-pull; right-left; front-back)
4. Movements should be controlled through a full Range of Motion using proper technique
5. Emphasize negative (eccentric) contractions
6. Use multiple variations of each basic movement (e.g., outward push, downward pull)

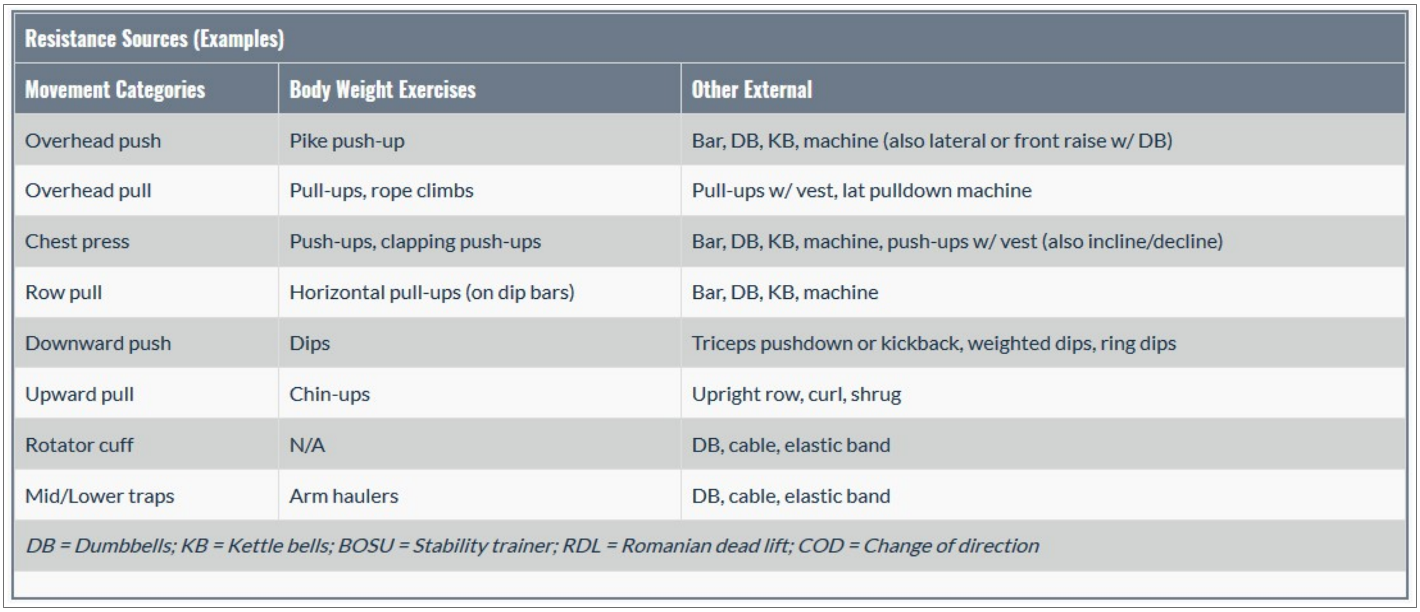
7. For the trunk, use a variety of static as well as dynamic exercises
8. Be sure to include exercises for the vulnerable or underdeveloped areas
9. Mix up the order of exercises (but alternate push-pull)

Problem areas that are often weak and underdeveloped, and should be targeted to avoid injury:

1. Rotator cuff
2. Mid/lower traps
3. Rhomboids
4. Posterior and medial glutes
5. Hamstrings
6. Tibialis anterior
7. Torso rotators

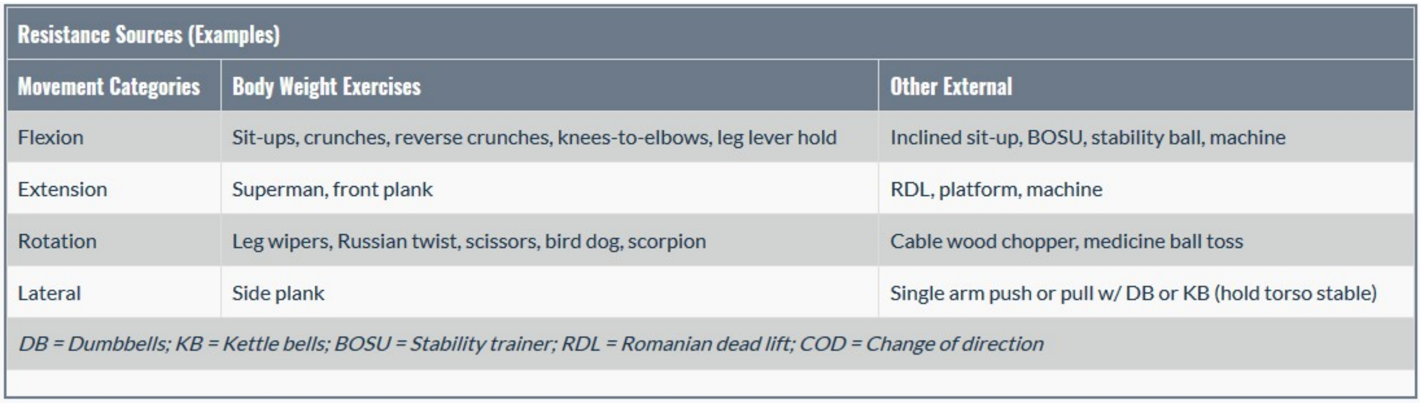
The movement category tables below provide the basic movement categories for the upper body, trunk, and lower body with examples of exercises using body weight or other forms of resistance (such as dumbbells).

Upper body exercises



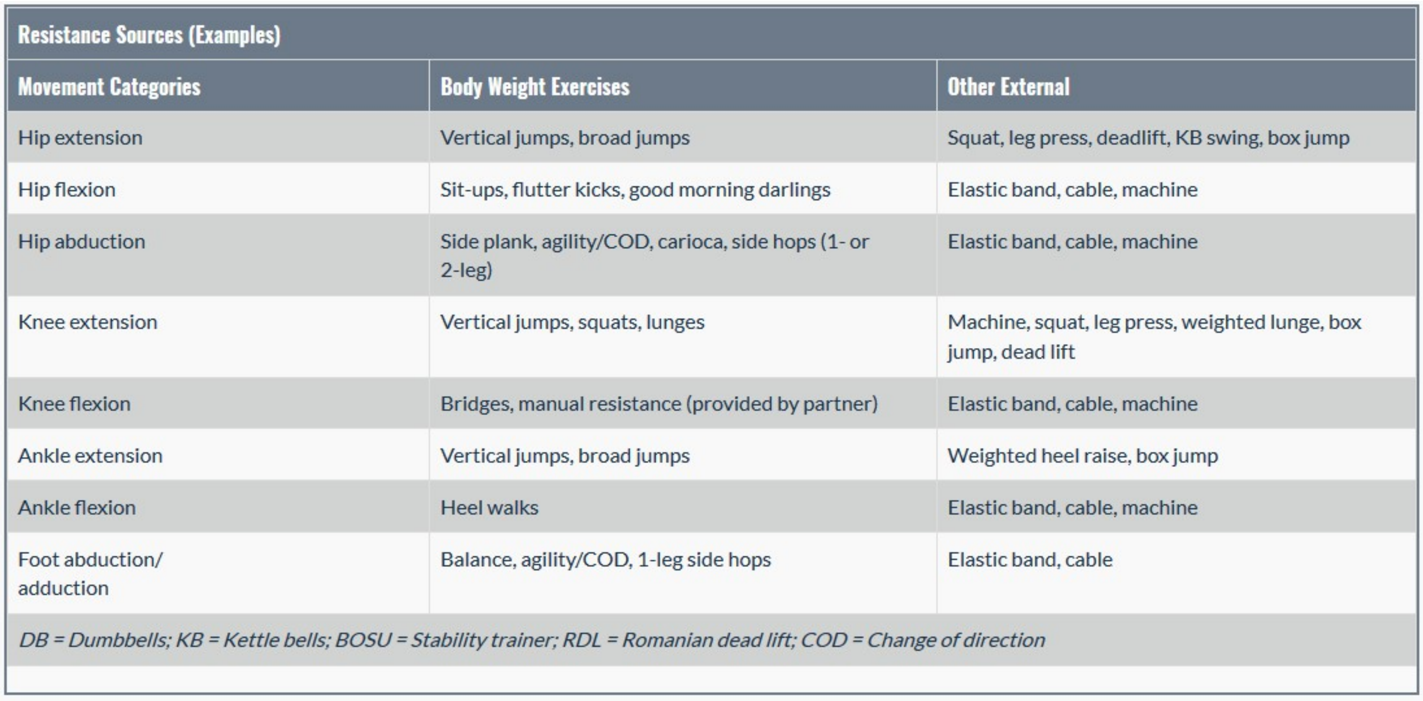
Resistance Sources (Examples)		
Movement Categories	**Body Weight Exercises**	**Other External**
Overhead push	Pike push-up	Bar, DB, KB, machine (also lateral or front raise w/ DB)
Overhead pull	Pull-ups, rope climbs	Pull-ups w/ vest, lat pulldown machine
Chest press	Push-ups, clapping push-ups	Bar, DB, KB, machine, push-ups w/ vest (also incline/decline)
Row pull	Horizontal pull-ups (on dip bars)	Bar, DB, KB, machine
Downward push	Dips	Triceps pushdown or kickback, weighted dips, ring dips
Upward pull	Chin-ups	Upright row, curl, shrug
Rotator cuff	N/A	DB, cable, elastic band
Mid/Lower traps	Arm haulers	DB, cable, elastic band
DB = Dumbbells; KB = Kettle bells; BOSU = Stability trainer; RDL = Romanian dead lift; COD = Change of direction		

Trunk exercises



Resistance Sources (Examples)		
Movement Categories	**Body Weight Exercises**	**Other External**
Flexion	Sit-ups, crunches, reverse crunches, knees-to-elbows, leg lever hold	Inclined sit-up, BOSU, stability ball, machine
Extension	Superman, front plank	RDL, platform, machine
Rotation	Leg wipers, Russian twist, scissors, bird dog, scorpion	Cable wood chopper, medicine ball toss
Lateral	Side plank	Single arm push or pull w/ DB or KB (hold torso stable)
DB = Dumbbells; KB = Kettle bells; BOSU = Stability trainer; RDL = Romanian dead lift; COD = Change of direction		

Lower body exercises



Resistance Sources (Examples)		
Movement Categories	**Body Weight Exercises**	**Other External**
Hip extension	Vertical jumps, broad jumps	Squat, leg press, deadlift, KB swing, box jump
Hip flexion	Sit-ups, flutter kicks, good morning darlings	Elastic band, cable, machine
Hip abduction	Side plank, agility/COD, carioca, side hops (1- or 2-leg)	Elastic band, cable, machine
Knee extension	Vertical jumps, squats, lunges	Machine, squat, leg press, weighted lunge, box jump, dead lift
Knee flexion	Bridges, manual resistance (provided by partner)	Elastic band, cable, machine
Ankle extension	Vertical jumps, broad jumps	Weighted heel raise, box jump
Ankle flexion	Heel walks	Elastic band, cable, machine
Foot abduction/ adduction	Balance, agility/COD, 1-leg side hops	Elastic band, cable

DB = Dumbbells; KB = Kettle bells; BOSU = Stability trainer; RDL = Romanian dead lift; COD = Change of direction

-End-

PTG Supplement

Physical Training Guidelines

The *Naval Special Warfare Physical Training Guide* (NSW PTG) exists to provide guidance regarding physical preparation for NSW-NSO programs such as BUD/S or BCT. The PTG provides a specific program for preparing for the Physical Screening Test (PST) along with more general fitness advice to promote endurance, strength, and resistance to injury once a candidate has received a contract. This *Physical Training Guide Supplement* provides additional guidance for developing a strength program. Key points:

- Keep it simple
- Use proper technique (get coaching from qualified sources if necessary)
- Develop the whole body, especially the parts known to be vulnerable to injury

This illustrated guide provides details regarding which areas of the body should be targeted for training. There are examples of exercises that target these areas, but recognize this is not meant to be a definitive list and many other exercises may be used if they target the proper areas. For more detailed discussion of concepts such as sets, reps, frequency of training, split routines, etc. – please consult SEALSWCC.com:

https://www.sealswcc.com/forums/forum/fitness/strength-training/149-strength-training-start-here

Another excellent resource that includes a wide variety of exercises appropriate for this program is the Navy Operational Fueling & Fitness System (NOFFS):

http://www.navyfitness.org/fitness/noffs/

NAVAL SPECIAL WARFARE CENTER
CORONADO, CALIFORNIA

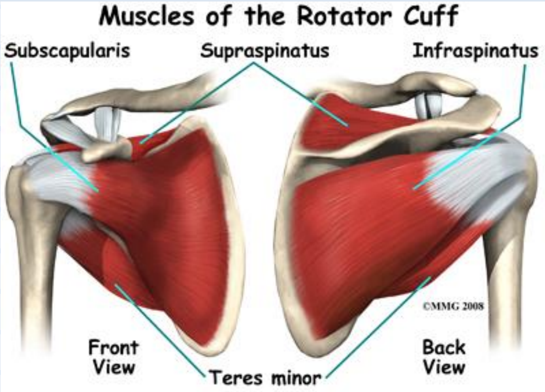
How To Create a Workout:

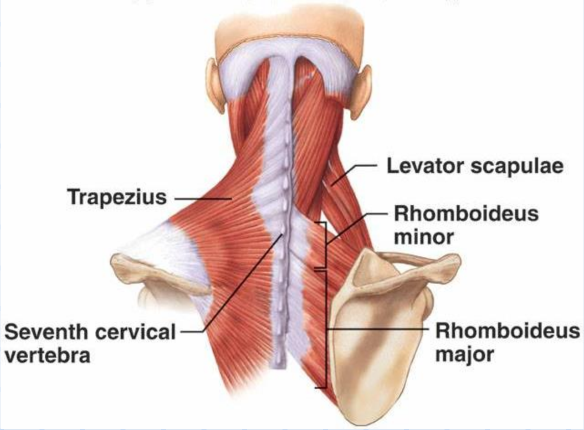
- Choose exercises for the upper body, trunk, and lower body
- Choose exercises that create movement in all three planes
- Choose exercises that create balance (push-pull; right-left; front-back)
- Movements should be controlled through a full Range of Motion using proper technique
- Emphasize negative (eccentric) contractions
- Use multiple variations of each basic movement (e.g., outward push, downward pull)
- For the trunk, use a variety of static as well as dynamic exercises
- Be sure to include exercises for the vulnerable or underdeveloped areas
- Mix up the order of exercises (but alternate push-pull)

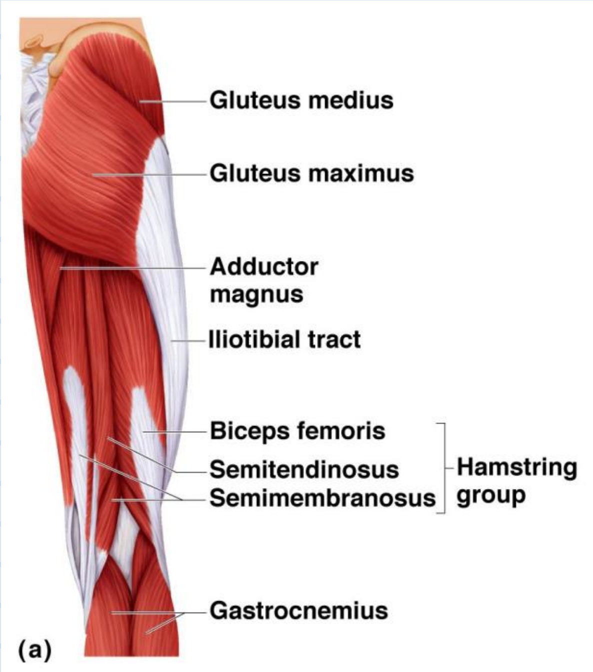
Movement Categories				Resistance Sources (Examples)	
				Body Weight	Other (External)
UPPER	1	Overhead Push	↑	pike push-ups	bar, DB, KB, machine (also lateral or front raise w/ DB)
	2	Overhead Pull	↓	pull-ups, rope climbs	pull-ups w/ vest, lat pulldown machine
	3	Chest Press	→	push-ups, clapping push-ups	bar, DB, KB, machine, push-ups w/ vest (also incline/decline)
	4	Row Pull	←	horizontal pull-ups (on dip bars)	bar, DB, KB, machine
	5	Downward Push	↓	dips	triceps pushdown or kickback, weighted dips, ring dips
	6	Upward Pull	↑	chin-ups	upright row, curl, shrug
	7	Rotator Cuff	↺	n/a	DB, cable, elastic band
	8	Mid/lower traps		arm haulers	DB, cable, elastic band
TRUNK	9	Flexion		sit-ups, crunches, reverse crunches, knees-to-elbows, leg lever hold	inclined sit-up, BOSU, stability ball, machine
	10	Extension		Superman, front plank	RDL, platform, machine
	11	Rotation		leg wipers, Russian twist, scissors, bird dog, scorpion	cable wood chopper, medicine ball toss
	12	Lateral		side plank	single arm push or pull w/ DB or KB (hold torso stable)
LOWER	13	Hip Ext		vertical jumps, broad jumps	squat, leg press, dead lift, KB swing, box jump
	14	Hip Flex		sit-ups, flutter kicks, good morning darlings	elastic band, cable, machine
	15	Hip ABD		side plank, agility/COD, carioca, side hops (1- or 2-leg)	elastic band, cable, machine
	16	Knee Ext		vertical jumps, squats, lunges	machine, squat, leg press, weighted lunge, box jump, dead lift
	17	Knee Flex		bridges, manual resistance (provided by partner)	machine, elastic band, cable
	18	Ankle Ext		vertical jumps, broad jumps	weighted heel raise, box jump
	19	Ankle Flex		heel walks	elastic band, machine, weighted heel walk
	20	Foot ABD/ADD		balance, agility/COD, 1-leg side hops	elastic band, cable

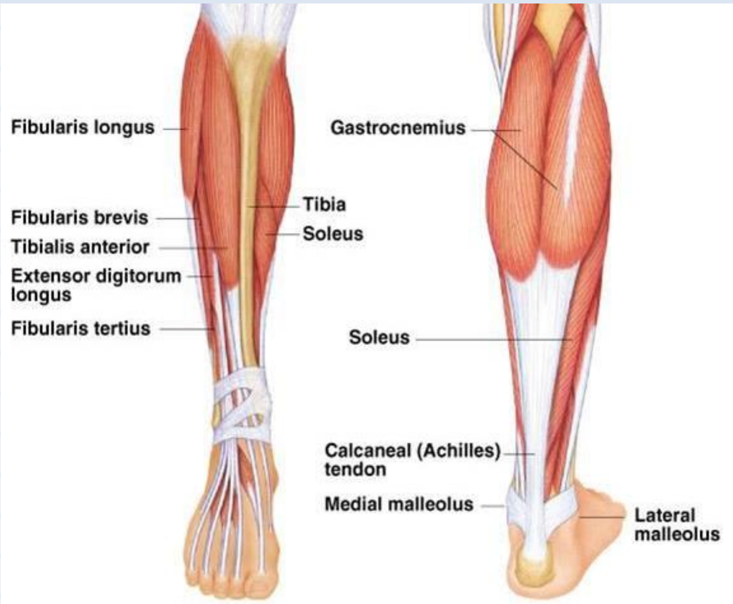
Problem Areas: Weak & Underdeveloped

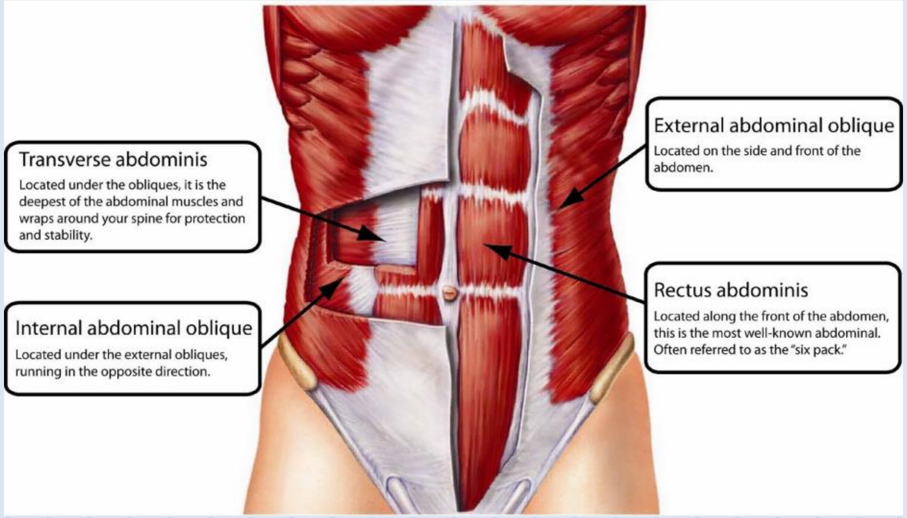
Rotator cuff, mid/lower traps, rhomboids, posterior & medial glutes, hamstrings, tibialis anterior, **torso rotators**










External abdominal oblique

Located on the side and front of the abdomen.

Transverse abdominis

Located under the obliques, it is the deepest of the abdominal muscles and wraps around your spine for protection and stability.

Rectus abdominis

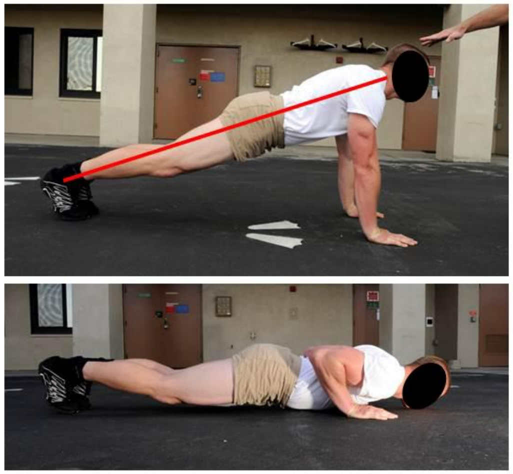
Located along the front of the abdomen, this is the most well-known abdominal. Often referred to as the "six pack."

Internal abdominal oblique

Located under the external obliques, running in the opposite direction.

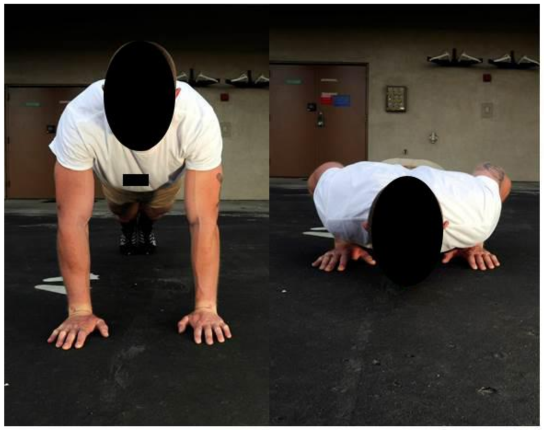
Push-Up, Side View

- Category: upper body push away
- Back straight; straight line from heels through knees, hips, shoulders
- At top: elbows locked out and shoulders fully protracted
- At bottom: chin, chest barely touch ground to achieve full ROM, but body weight remains on hands and feet
- Elbows move next to body, not flared out away from body



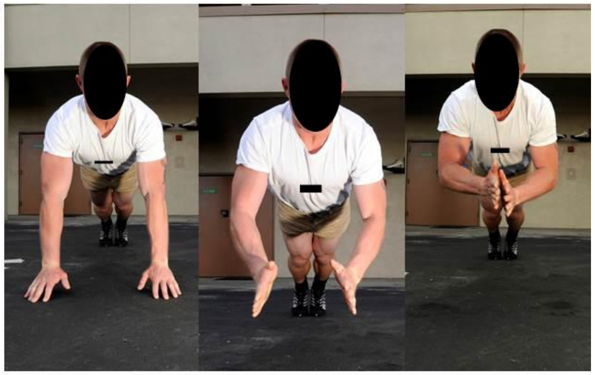
Push-Up, Front View

- Hands directly under shoulders, not wider
- Fingers forward, not inward (to direct elbows next to body, not flared away)
- Feet close together (narrower than hips)



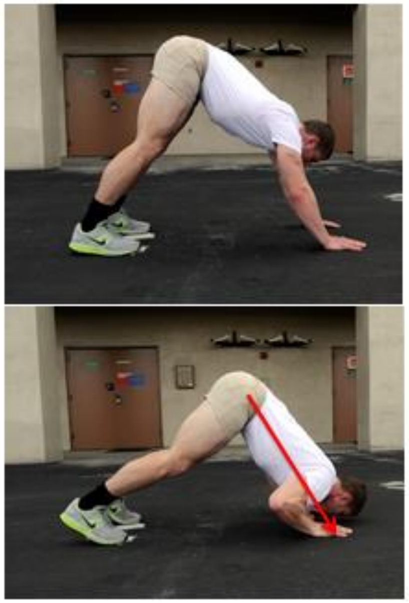
Clapping Push-Up

- Category: upper body push away
- Same criteria as regular push-up regarding back, shoulder, hand positions
- Push upward explosively and clap hands firmly together
- As hands return to ground, be sure to immediately bend elbows to absorb impact



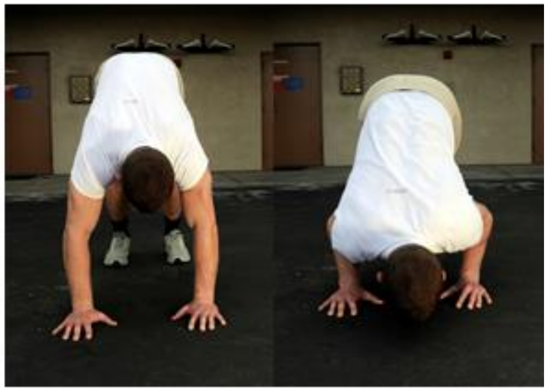
Pike Push-Up, Side View

- Category: upper body push overhead
- Hips/trunk flexed (pike position)
- Create resistance to simulate an overhead press
- At top: elbows locked out and shoulders fully protracted
- At bottom: neck carefully extended; gently touch forehead to ground to create full ROM
- Attempt to keep elbows near body, not flared away



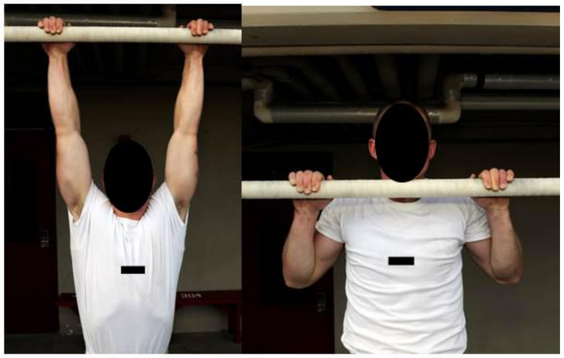
Pike Push-Up, Front View

- Hands directly under shoulders, not wider
- Fingers forward, not inward (to direct elbows next to body, not flared away)
- Feet comfortably spaced for balance (not too wide)



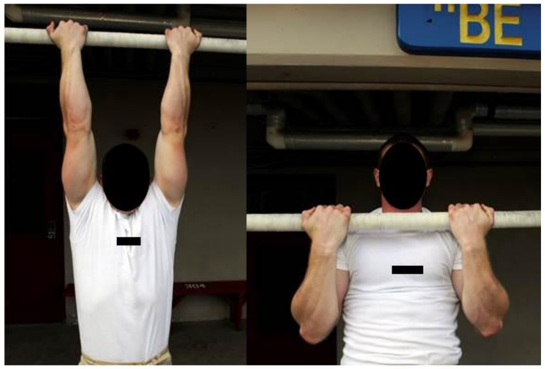
Pull-Up

- Category: upper body pull overhead
- Hands comfortably spaced, approximately shoulder width
- At bottom: arms at full extension and completely relaxed
- At top: chin entirely above bar
- Do not swing or kip



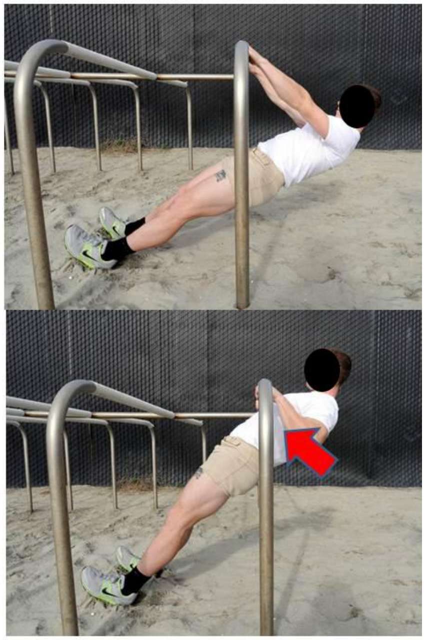
Chin-Up

- Category: upper body pull upward
- Similar movement as a biceps curl
- Hands comfortably spaced, approximately shoulder width
- At bottom: arms at full extension and completely relaxed
- At top: chin entirely above bar
- Do not swing or kip



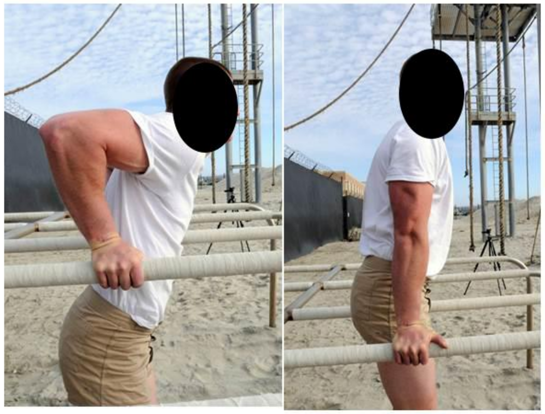
Horizontal Pull-Up

- Category: upper body pull towards
- Hands comfortably spaced, approximately shoulder width
- Back should remain straight at all times (don't arch back or sit towards ground)
- At bottom: arms fully extended and relaxed
- At top: chest contacts bar while drawing shoulder blades back
- Place feet away from bar so body is approaching horizontal, not vertical
- A lower bar or elevated feet create a better effect



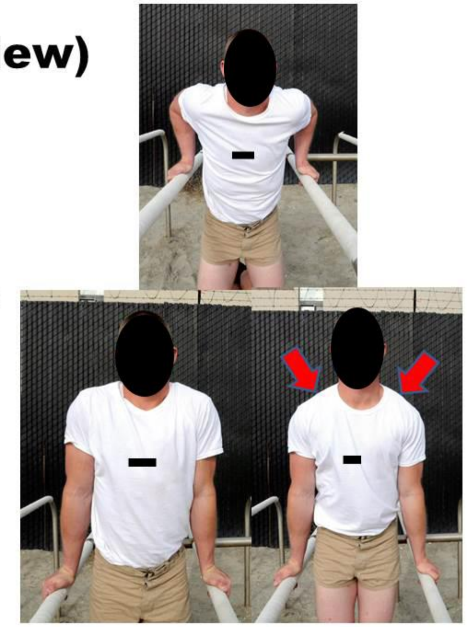
Dip (Side View)

- Category: upper body push downward
- At bottom: armpits above hands, upper arm parallel to ground
- At top: arms straight with elbows locked out
- Keep head up and torso vertical at all times



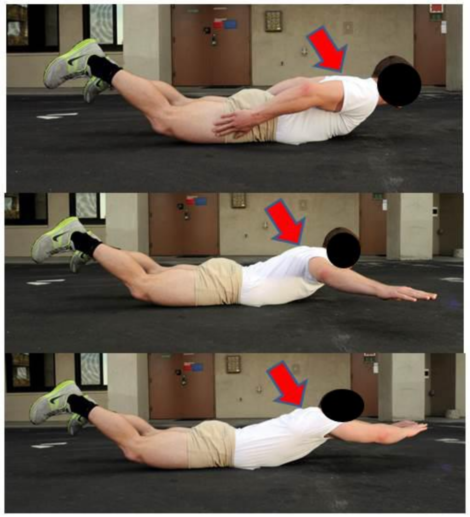
Dip (Front View)

- Keep elbows over bars
- At top: shoulders depressed/head elevated as much as possible (see picture at lower right)



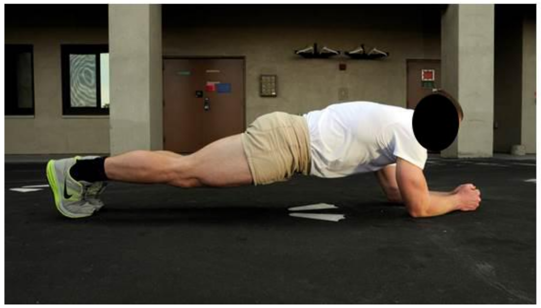
Arm Hauler

- Categories: upper body posterior shoulder; torso static extension
- Lift chest and legs off ground
- Move arms back and forth from directly at sides to straight out in front of torso
- Sweep arms parallel to ground without touching to keep tension on posterior shoulders



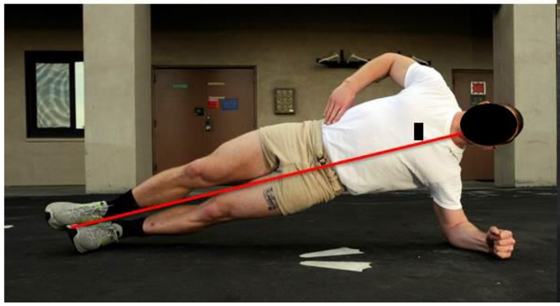
Front Plank

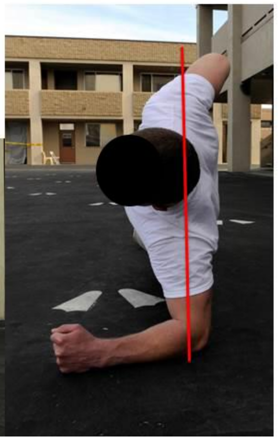
- Category: torso static extension
- Forearms comfortably placed to support body weight
- Shoulders protracted (pushed forward)
- Feet close together (no wider than hips)
- Keep back straight at all times
- Keep a straight line through heels, knees, hips, spine, and shoulders
- Do not let the buttocks push into the air or sag towards the ground



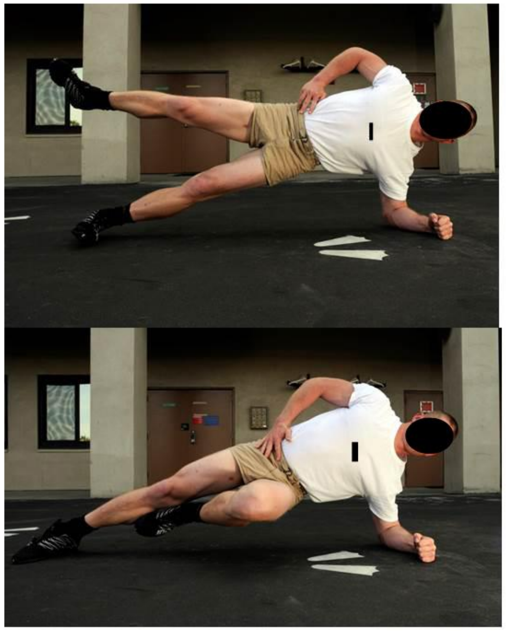
Side Plank

- Category: torso static lateral flexion
- Forearm comfortably placed to support body weight
- Front view: hips off ground with midline straight from feet to neck
- Top view: line of chest/shoulders is perpendicular to ground
- Hips remain between feet and shoulders; do not let buttocks push out behind torso
- Right side plank mirrors the left side





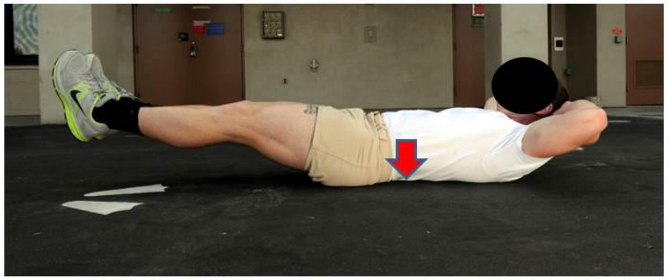
Side Plank (Advanced)



- Categories: torso static lateral flexion; lower body hip abduction/adduction
- Straight midline and perpendicular chest/shoulders (same as basic side plank)
- More challenging than basic side plank to stabilize midline, and also provides resistance to lateral and medial hip

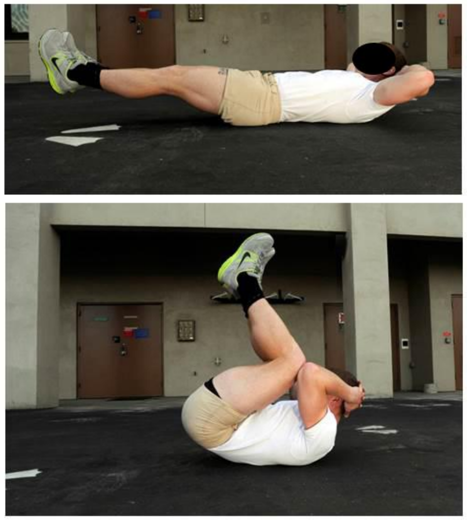
Leg Lever Hold

- Category: torso static flexion
- Legs straight and together, with feet 6-8” off ground (not higher)
- Pelvis in neutral position – keep small of back in contact with ground; think of drawing the navel down towards the ground
- Tailbone will be pointed away from ground and protected by buttocks, so it should not be necessary to place hands under buttocks
- Keep hands behind head with neck in comfortable position (up or down)



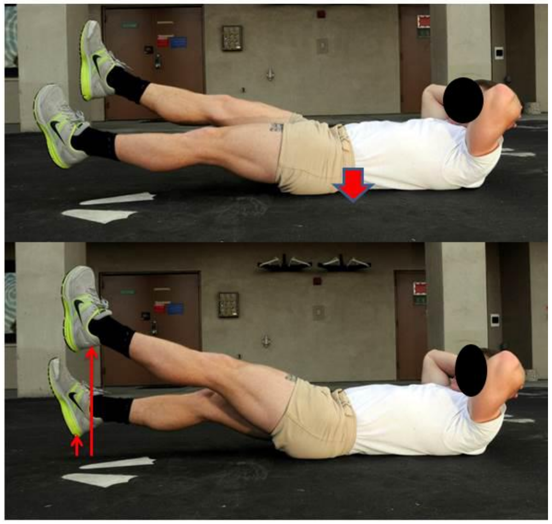
Reverse Crunch

- Category: torso dynamic flexion
- Starting position is leg lever hold
- Lift hips off ground and bring knees in contact with elbows
- Do not move chest or torso; do not move elbows towards knees
- Return to leg lever hold position with legs straight and feet slightly off the ground
- Attempt to complete all reps without letting the feet touch the ground

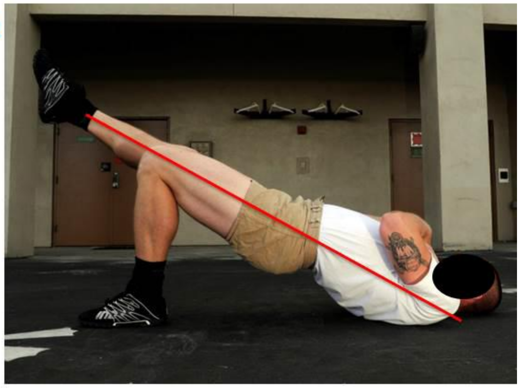


Flutter Kick

- Categories: torso static flexion; lower body hip flexion
- Starting position is leg lever hold
- Focus on keeping pelvis neutral with small of back against the ground
- Keeping legs straight, alternate raising and lowering right and left feet
- Do not let feet touch ground, and only raise feet 12-18" above ground – keep constant tension on hip flexors



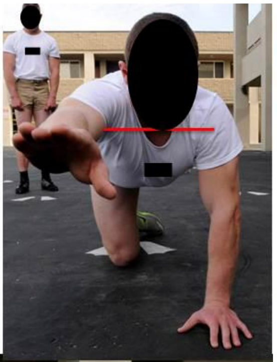
Single Leg Bridge

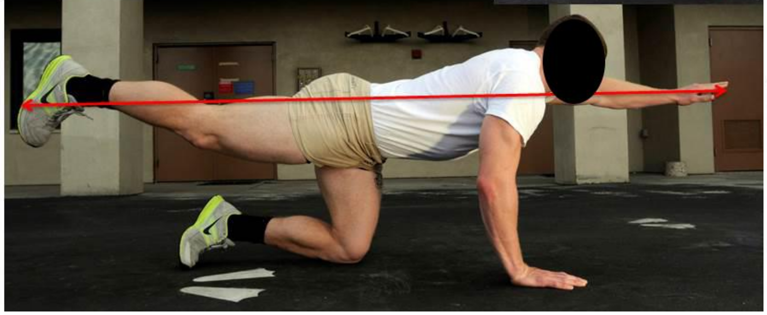


- Categories: lower body partial hip extension & knee flexion (works glutes & hamstrings); torso static extension & rotation
- Support leg placed so tibia is perpendicular to ground
- Opposite leg straight, angled approximately 45 degrees
- Thighs together and parallel
- Drive hips/buttocks off ground
- Create a straight line through knee, hip, spine, and shoulder
- Keep hips even off ground (do not roll towards unsupported side)
- Arms across chest so that shoulders are base of support

Bird Dog

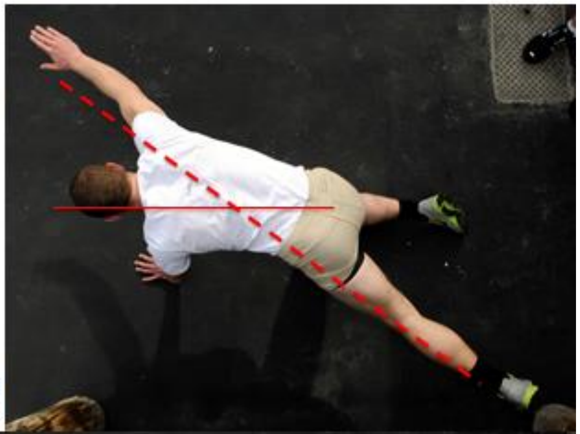
- Category: torso static rotation
- One arm and opposite leg raised parallel to ground
- Arm straight forward, leg straight back
- Create a long, flat profile
- Keep torso stable with other arm and leg

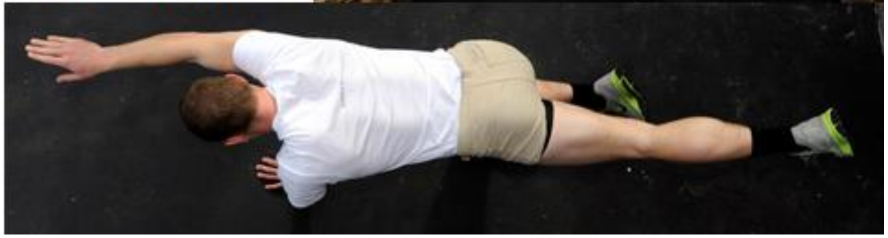




Bird Dog (Advanced)

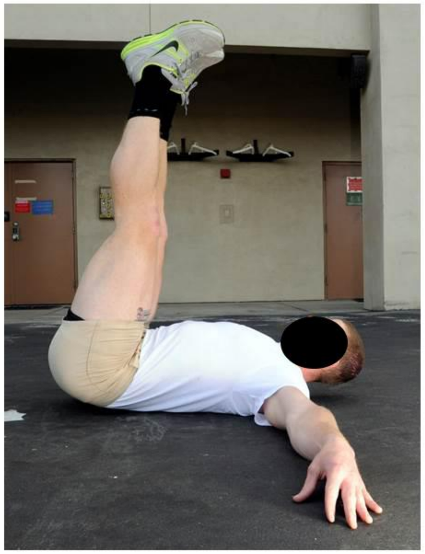
- Move arm and leg simultaneously back and forth in a 45 degree arc
- Keep arm and leg in a plane parallel to the ground
- Keep torso completely stable and motionless





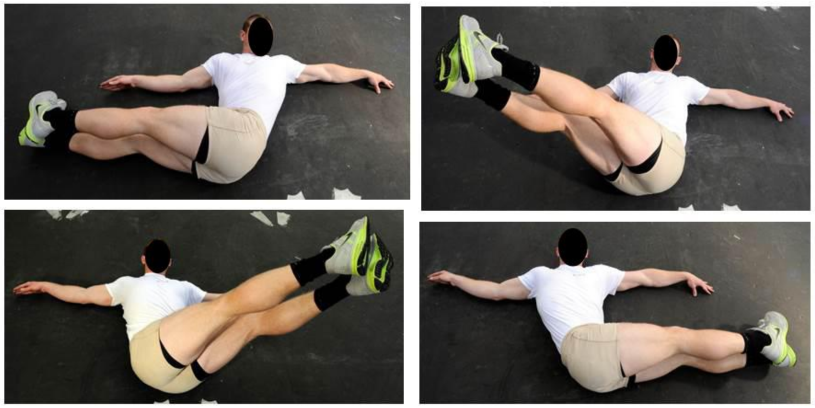
Wiper (Side View)

- Category: torso dynamic rotation
- Back and shoulder blades remain in contact with the ground at all times
- Legs straight and together at all times
- Hips at 90 degrees at all times



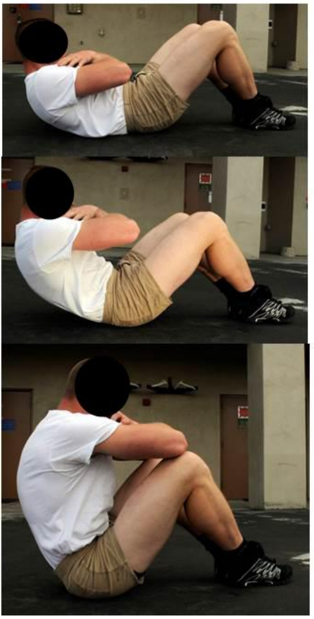
Wiper (Front View)

- Use muscles of torso to move legs back and forth in a 180 degree arc
- Keep tempo controlled so the torso moves the legs (momentum of legs does not move torso)



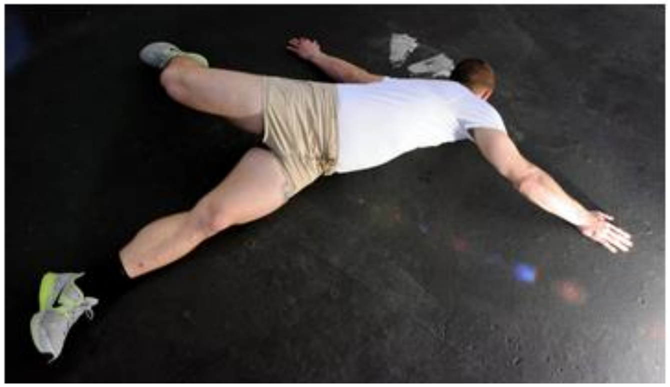
Sit-Ups

- Category: torso dynamic flexion
- Start with knees bent to 90 degrees, shoulder blades touching ground, arms folded across chest
- Smoothly curl trunk up starting with head, then shoulders, then middle back, then lower back, until elbows contact knees
- Smoothly return to starting position in opposite order: lower back touches first, then middle back, then shoulders, finally head



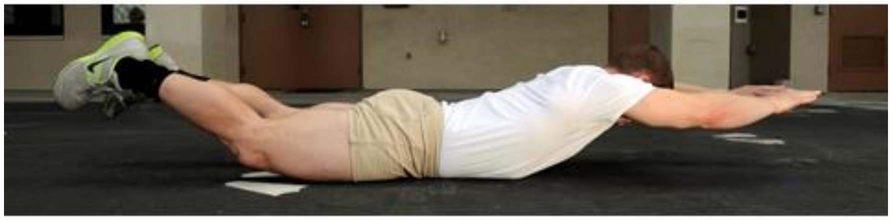
Scorpion

- Category: torso dynamic rotation
- Start in prone position with legs together
- Rotate lower torso and hips to swing one leg across body, touching heel to ground
- Return to starting position and swing other leg across body to other side
- Do not raise chest from ground



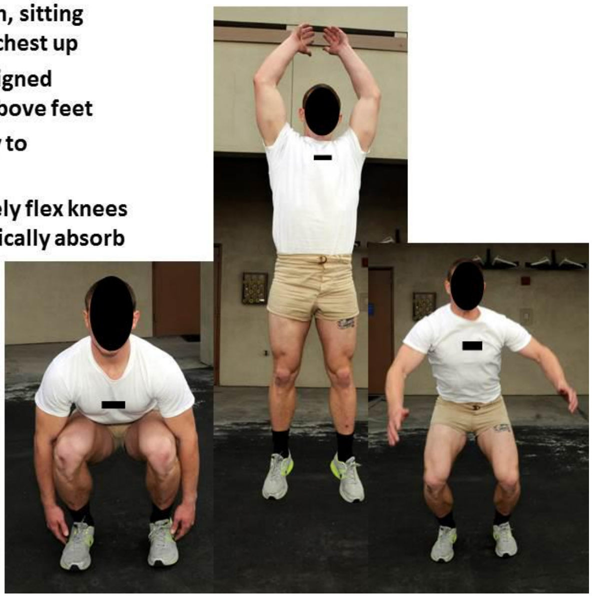
Superman

- Category: torso dynamic extension
- Start prone with legs together and arms extended above head
- Lift feet off ground while keeping legs straight
- Lift chest and arms off ground



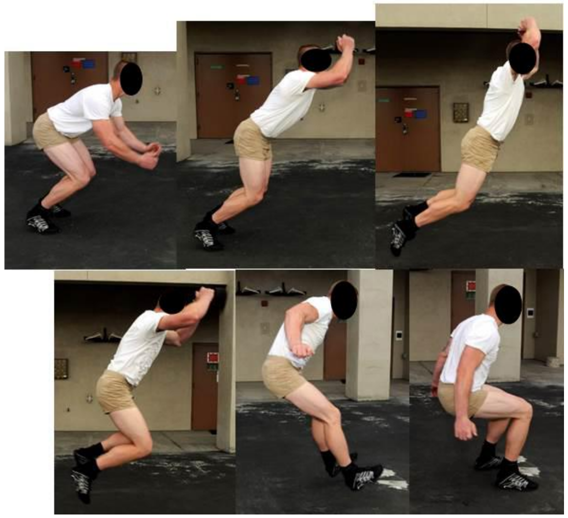
Vertical Jump

- Category: hip, knee, ankle extension
- Begin with buttocks down, sitting back on heels, head and chest up
- Feet are hip width and aligned forward, and knees are above feet
- Jump upward explosively to maximum height
- Upon landing, immediately flex knees and use quads to eccentrically absorb impact
- Knees aligned between feet & hips; don't let knees bow out or knock together
- With control, return to starting position



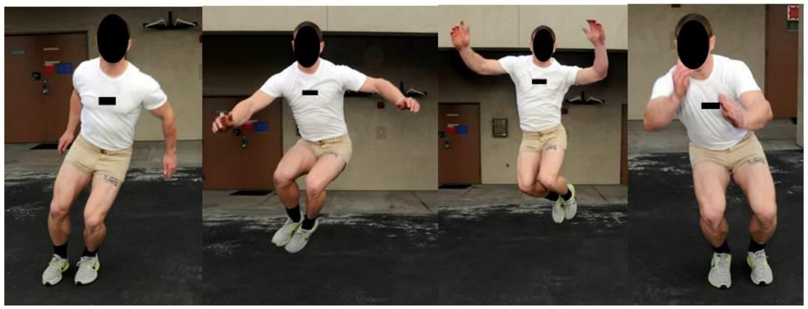
Broad Jump

- Category: hip, knee, ankle extension
- Initial foot placement same as vertical jump
- Use arm swing and countermovement
- Jump forward explosively to maximum distance
- Upon landing, immediately flex knees and use quads to eccentrically absorb impact
- Land with control and balance, without shuffling feet or touching hands to ground
- After brief pause, jump again; repeat for desired number of reps



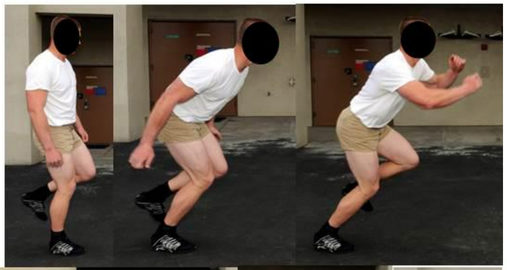
Lateral Hop

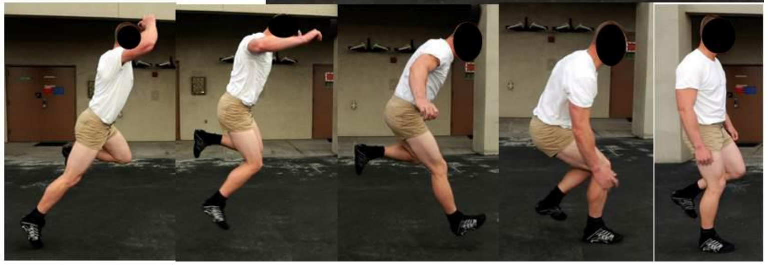
- Category: lateral hip & ankle
- Begin with feet close together (hip width or less)
- Keeping feet together, jump as far as possible to one side
- Land with control, pause briefly, and jump back to the other side
- Repeat for desired number of reps



Forward Hop (One Leg)

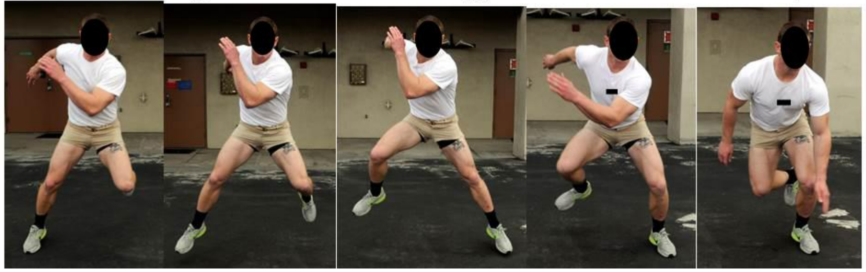
- Category: hip & knee extension; ankle extension & lateral
- Begin balanced on one foot
- Using one leg, jump forward as far as possible while landing secure on the same foot
- Pause briefly with balance before jumping again
- After completing desired reps, do same with other leg





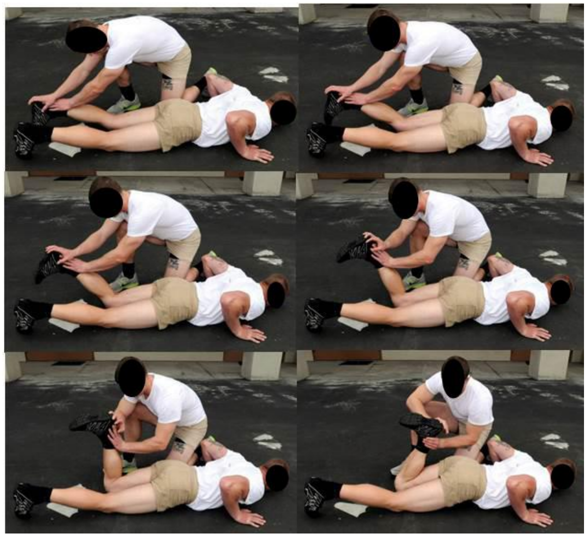
Lateral Hop (One Leg)

- Category: lateral hip & ankle
- Begin balanced on one foot
- Leap to the side as far as possible while landing secure on the opposite foot
- Pause briefly with balance before leaping back in the other direction
- Alternate leaping side to side from one foot to the other, maintaining balance when landing, for desired number of reps



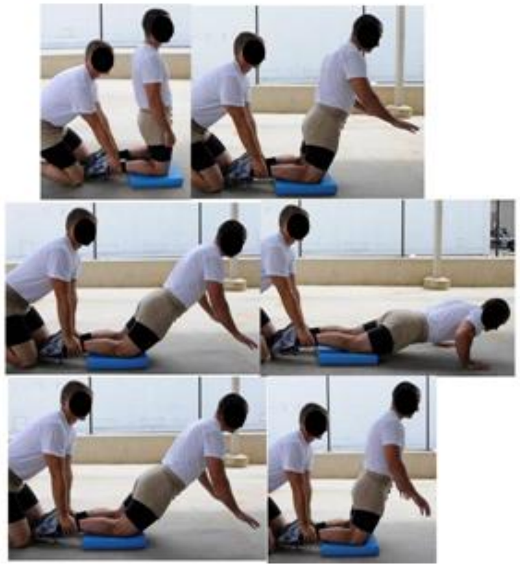
Manual Hamstring Curl

- Category: Knee Flexion
- Partner provides resistance in both directions (concentric and eccentric)
- Move through full ROM, with leg straight at the bottom and heel as close to buttocks as possible at top
- Keep toes pointed towards ground; keep both thighs together
- Partner adjusts resistance so leg moves up and down smoothly in a normal cadence without pausing
- Partner provides enough resistance to make effort difficult, but able to keep moving up and down



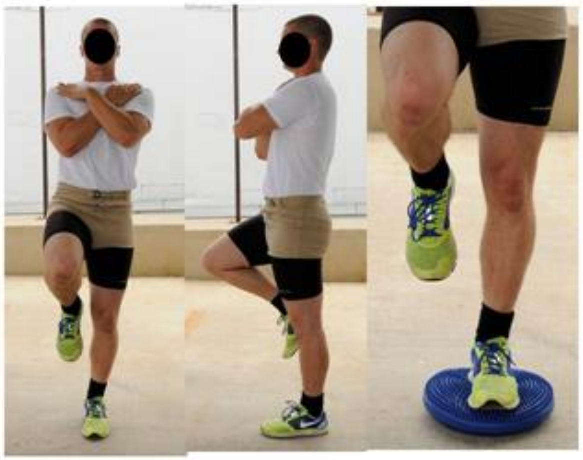
Nordic Hamstring Curls

- Category: knee flexion (hamstrings)
- Feet secured
- Begin with torso erect; keep back straight at all times
- Fall forward, using hamstrings to slow descent as much as possible, using hands to absorb impact at very end
- Push off ground with hands, and use hamstrings to pull torso erect
- Goal is to maximize contribution of hamstrings and catch/push with hands as little as possible



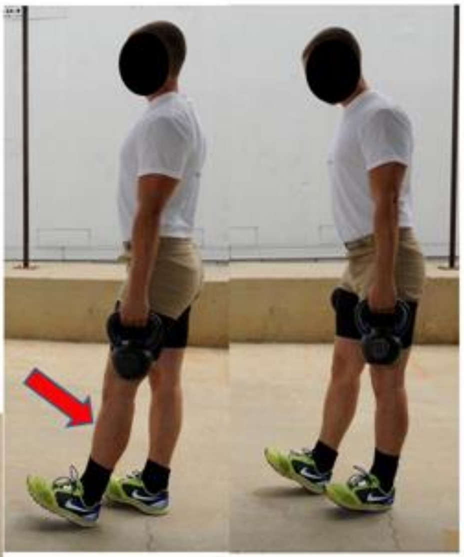
Single Leg Balance

- Category: lateral foot/ankle
- Fold arms across chest, draw heel of one foot up to knee of opposite leg
- Maintain balance on one leg with no movement for as long as possible
- Begin with eyes open. As balance improves (stable for 45 seconds or more), try to maintain balance with eyes closed
- Progress from hard floor to unstable surface



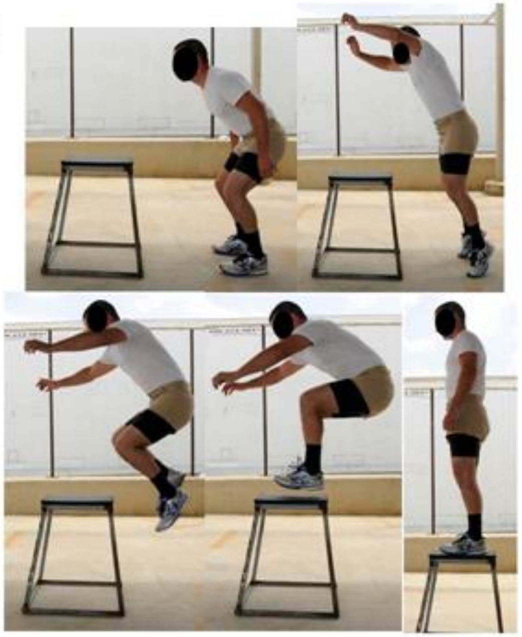
Heel Walk

- Category: ankle flexion (dorsiflexion)
- Walk entirely on heels, with toes pulled upward (dorsiflexed) as far as possible
- Keep tension on *tibialis anterior*
- Walk with a medium tempo and take medium steps (not a speed walk)
- Carry weight (farmer's walk) if desired



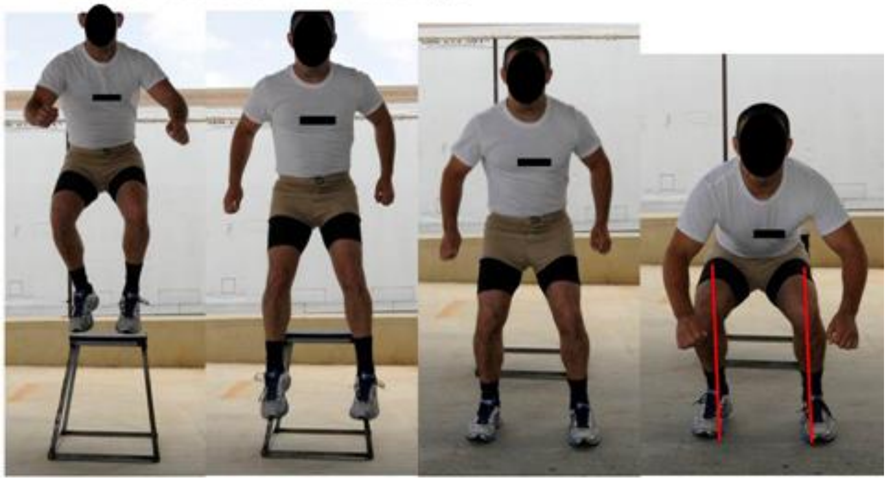
Box Jump

- Category: hip, knee, ankle extension
- Choose appropriate box height (challenging but attainable)
- Begin with feet under hips and toes forward
- Squat down (counter movement) before jumping upward explosively
- Land with both feet entirely on top of box. Pause briefly with legs fully extended
- Jump off backward, away from box



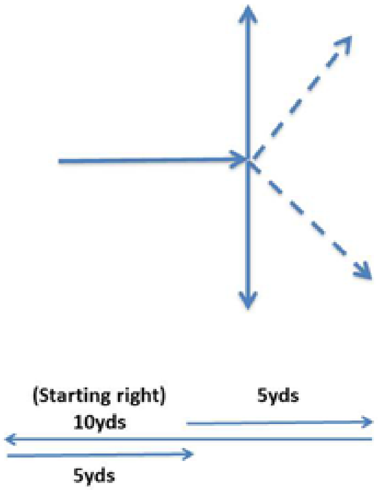
Box Jump

- Landing technique is critical: begin bending knees at first contact, bend knees sufficiently to absorb impact, and try to keep knees aligned between ankles and hips



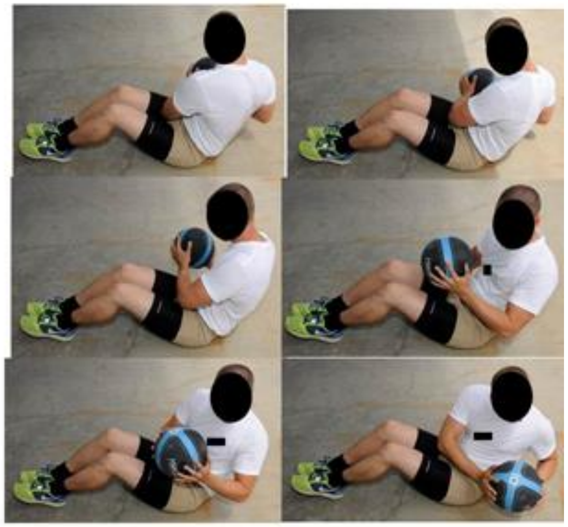
Sprints/Agility

- Category: hamstrings; lateral hip/ankle
- Warm up thoroughly. To avoid injury, do not perform sprints when fatigued
- All-out effort on each rep (top speed)
- Distance: approx. 40-60yds each rep
- Reps: approx. 4-6 total (or until unable to maintain top speed)
- Generous recovery between reps
- Use Change of Direction (COD): cut left or right, 45 or 90°; do 5-10-5yds (start left or start right; touch hand to ground when changing direction)
- Variations: start from prone position; sprint forward then backward; sprint forward then lateral shuffle or carioca left or right



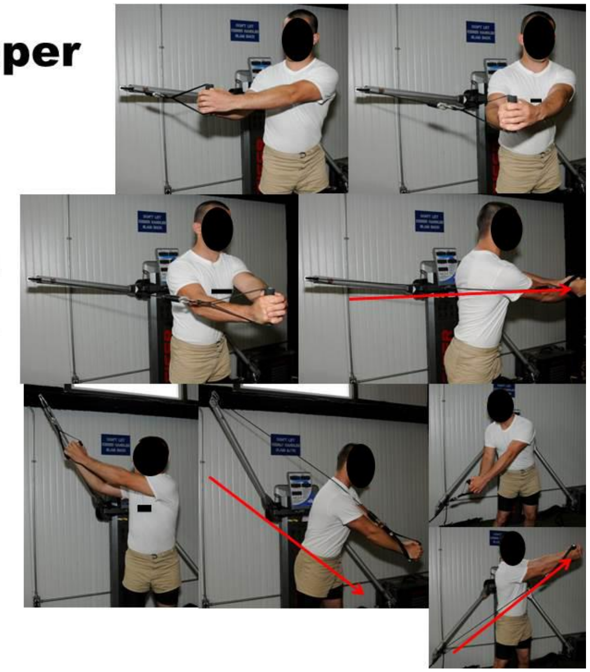
Russian Twist

- Category: torso rotation
- Lie back about 45° with knees bent
- Hold a weight (a plate or med ball) for extra resistance
- Rotate torso to one side and touch the ground; rotate to other side and touch the ground; alternate
- Keep hands directly in front of chest. Torso must rotate to bring hands to ground. Do not swing the arms from side to side without rotating torso



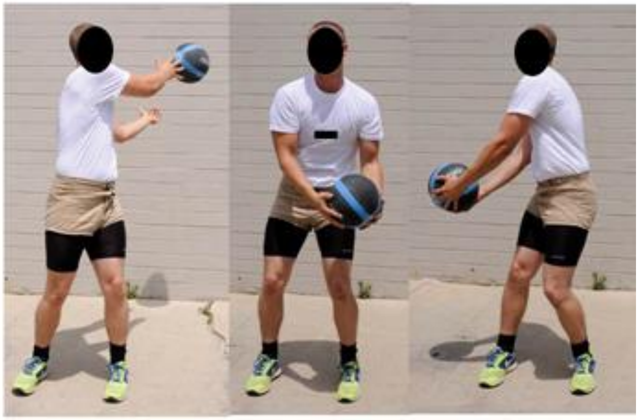
Wood Chopper

- Category: torso rotation
- Stand next to a cable weight machine; grab handle with arms extended
- Keep legs, hips, arms still
- Rotate torso through full range of motion (approx. 180°); return to starting position
- Complete desired number of reps, then reverse position to rotate in the opposite direction
- Variations: move hands across, down, or up



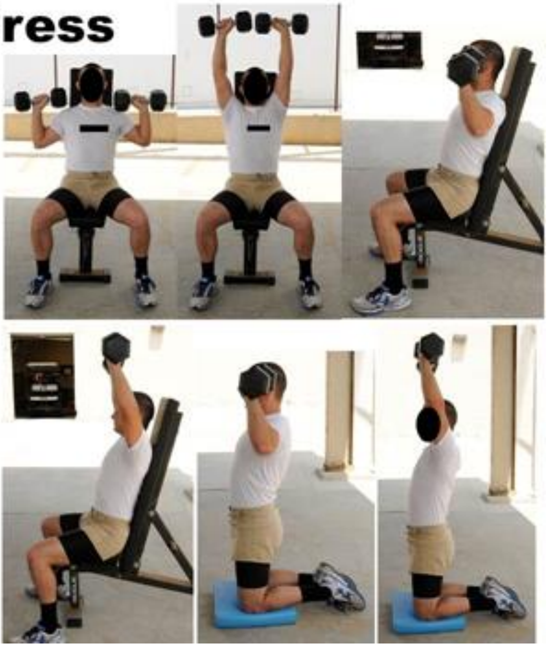
Med Ball Toss

- Category: torso rotation
- Stand with back to wall, holding a medicine ball
- Throw forcefully to one side; catch ball as it bounces back
- Complete desired reps before throwing to other side; or, alternate throws to each side



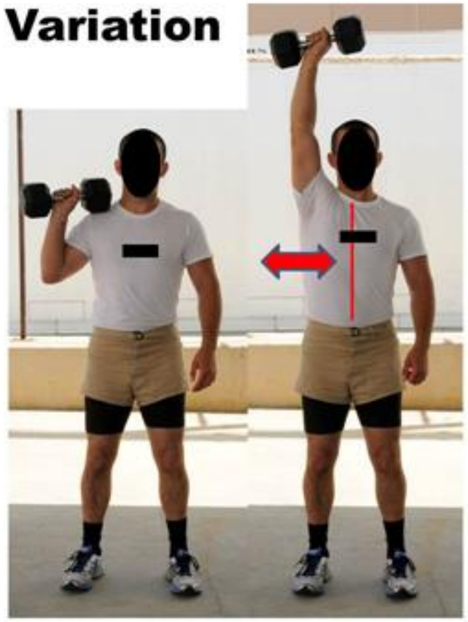
Shoulder Press

- Category: overhead push
- Keep back stable (with support if necessary)
- Begin with dumbbells at shoulder level; push dumbbells directly overhead until arms are fully extended
- Pause briefly at top; with control, lower dumbbells back to shoulder level
- May perform while seated, kneeling, or standing – but keep back stable, without collapse of lumbar spine
- May use other resistance (such as barbell or kettle bells)



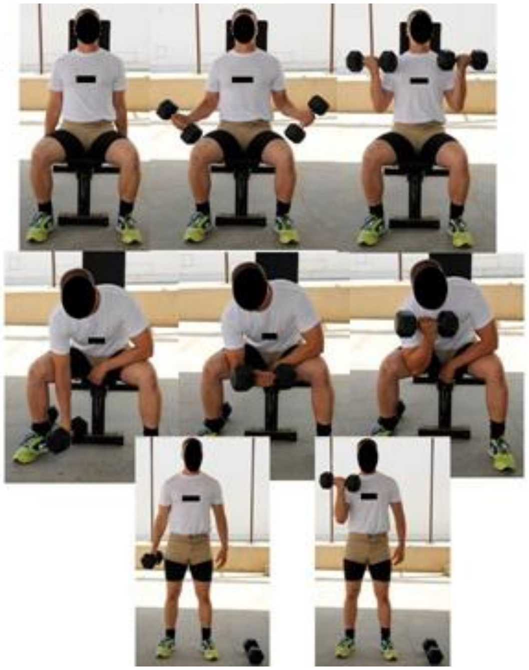
Shoulder Press Variation

- Category: overhead push; torso lateral stability
- Use one dumbbell, one arm
- Stand with dumbbell at shoulder level
- Press dumbbell overhead until arm is fully extended; pause briefly before lowering with control back to shoulder level
- Keep torso erect and spine stable as weight is lifted; resist forces creating a lateral pull
- Keep opposite hand empty (no counter-weight)
- Complete reps with one arm; shift weight to other side and complete the same number of reps



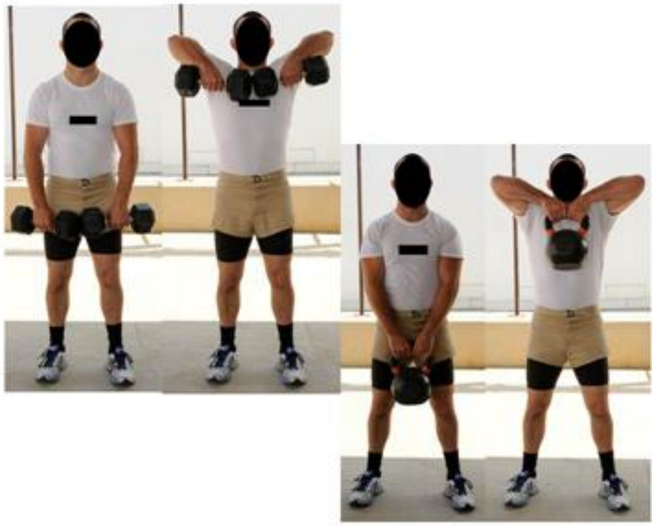
Biceps Curl

- Category: upward pull
- Keep torso stable in seated or standing position
- Begin with arms fully extended and curl dumbbell through full range of motion
- With control, lower dumbbell to full extension
- Do both arms together, or one arm at a time (maintain lateral stability of torso)
- May use other resistance (such as barbell or cable machine)



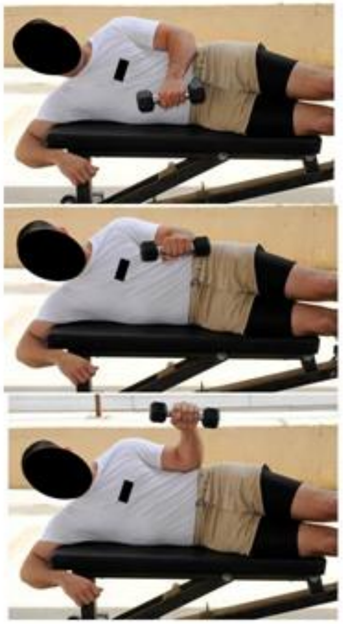
Upright Row

- Category: upward pull
- Stand with arms straight, weights resting against thighs, and palms inward
- Draw weights up in a straight line, stopping just below chin
- Bring elbows just above shoulders
- Keep torso upright (don't lean forward)



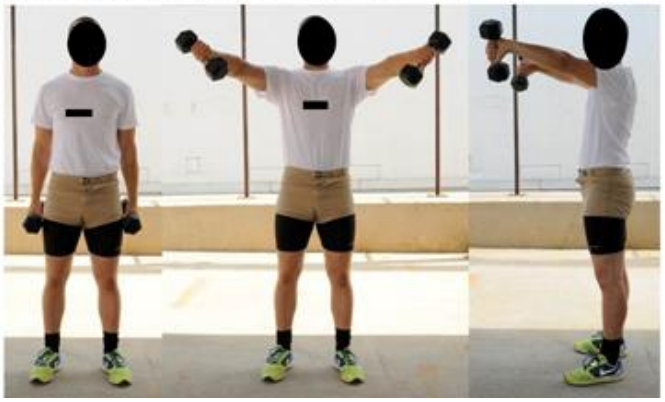
Shoulder External Rotation

- Category: rotator cuff
- Lie on side (on a bench or on the floor)
- Upper arm against torso and elbow at 90°
- Rotate forearm outward through full Range of Motion, pause briefly, return to starting position
- Do not let upper arm move away from torso; axis of rotation is through the humerus



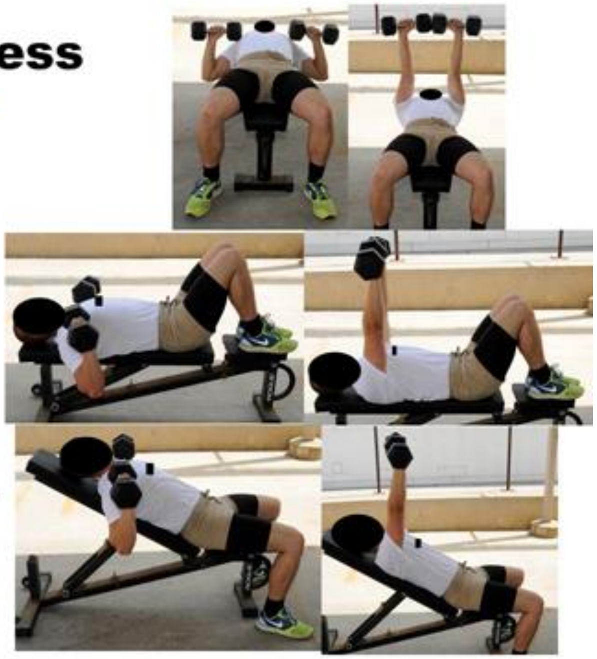
Y Exercise

- Category: scapular
- Stand with arms at sides and dumbbells in each hand
- Raise arms approx. 45° to the sides till hands are slightly above shoulders, thumbs downward in "empty can" position
- Pause briefly and lower hands with control



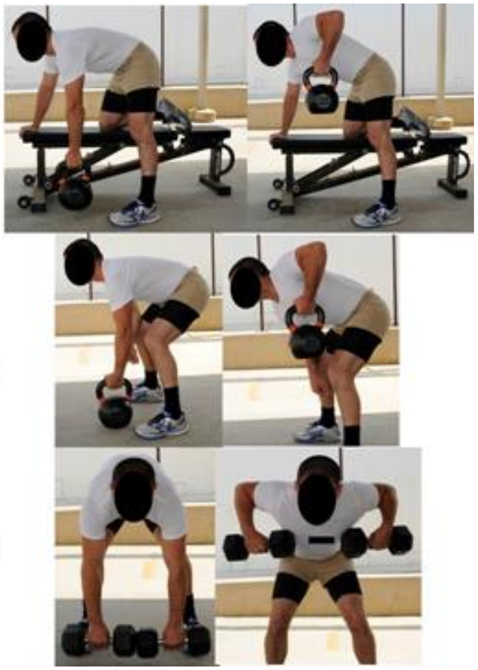
Chest Press

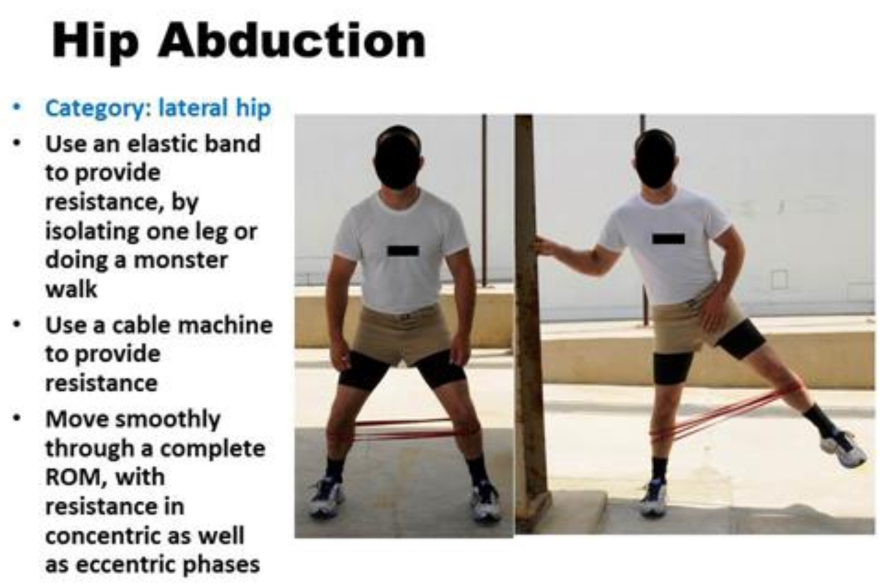
- Category: outward push
- Begin with back on bench, dumbbells against body at shoulder/upper chest level
- Feet on floor or end of bench; do not arch back during lift
- Press dumbbells away from chest in a natural path until arms are fully extended
- Pause briefly before lowering dumbbells with control to starting position
- Variation: incline or decline bench



Bent Over Row

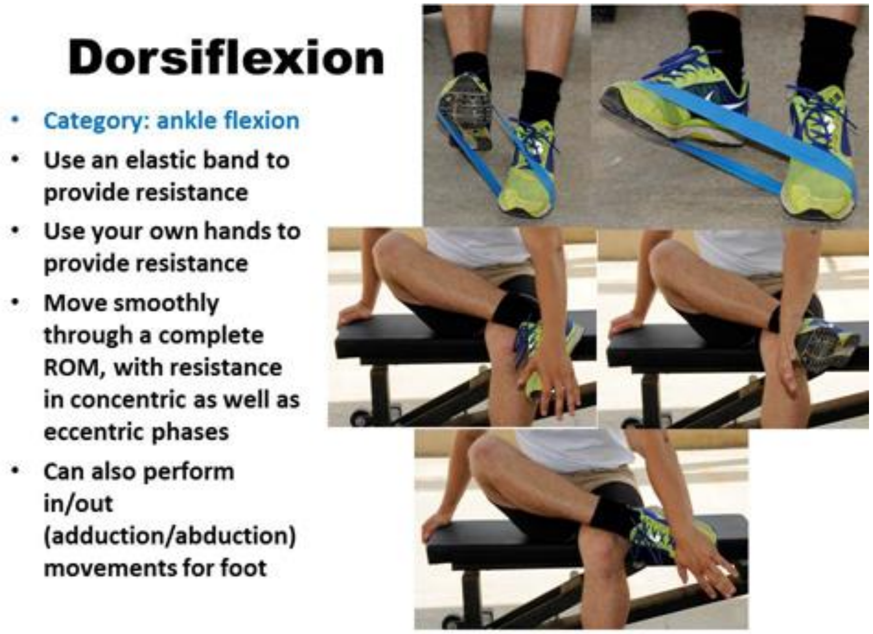
- Category: pull towards
- May use bench for support
- Grab weight with arm fully extended
- Pull weight directly to armpit; pause briefly, then lower with control
- Weight may touch ground, but not rest there
- Complete desired reps, then switch to other arm
- May lift two weights together (or use barbell) if lower back is strong enough to keep torso stable, parallel to ground





Hip Abduction

- Category: lateral hip
- Use an elastic band to provide resistance, by isolating one leg or doing a monster walk
- Use a cable machine to provide resistance
- Move smoothly through a complete ROM, with resistance in concentric as well as eccentric phases



Dorsiflexion

- Category: ankle flexion
- Use an elastic band to provide resistance
- Use your own hands to provide resistance
- Move smoothly through a complete ROM, with resistance in concentric as well as eccentric phases
- Can also perform in/out (adduction/abduction) movements for foot

Injury Prevention Guide

NAVAL SPECIAL WARFARE

BUD/S INJURY PREVENTION

DISCLAIMER: Preparation for this training can be equally strenuous. You should consult a physician before you begin any strenuous exercise program, such as the one described here, or any diet modification, especially if you have or suspect that you may have heart disease, high blood pressure, diabetes, or any other adverse medical conditions. If you feel faint or dizzy at any time while performing any portion of this training program, stop immediately and seek medical evaluation. The United States Government and any service member or civilian employed by the United States Government disclaims any liability, personal or professional, resulting from the misapplication of any training procedure, technique, or guidance described in this guide.

NAVAL SPECIAL WARFARE CENTER
CORONADO, CALIFORNIA

Prevention is the key to avoiding a visit to BUD/s medical for a movement related injury. It is too late to begin a preventative program once symptoms of an injury have been identified. Therefore, it is vital that BUD/s candidates properly prepare themselves to complete the rigorous training injury free. This preparation includes stretching and strengthening of specific muscles not usually addressed in a typical BUD/s candidate workout routine.

UPPER EXTREMITY INJURY PREVENTION

Stretching Exercises

- **Hold each for 30 seconds**
- **Repeat 3 times**
- **Perform 2 times a day**

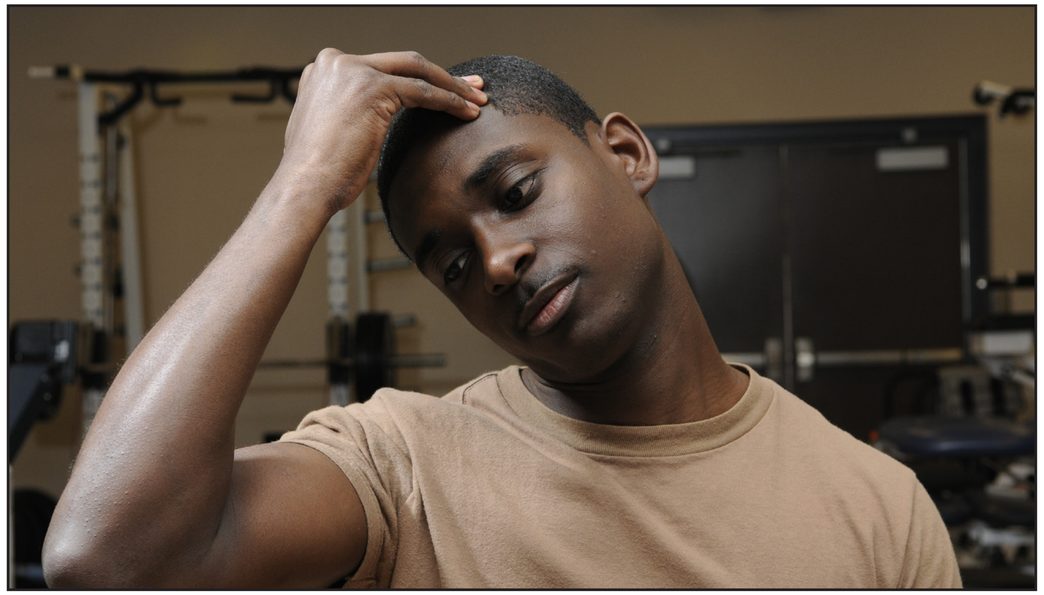
Stretches should NOT be painful!

Upper extremity injuries commonly encountered in BUD/s usually involve the shoulder, and are easily prevented with a consistent stretching and strengthening program.

- Scalene Stretch
- Lat and Prayer Stretch
- Pectoral Stretch
- Thumb-Down Shoulder Strength
- Lawnmower Pull (Mid Back)
- Shoulder External Rotation
- Shoulder Internal Rotation
- The “Y” Exercise
- The “T” Exercise
- The “W” Exercise

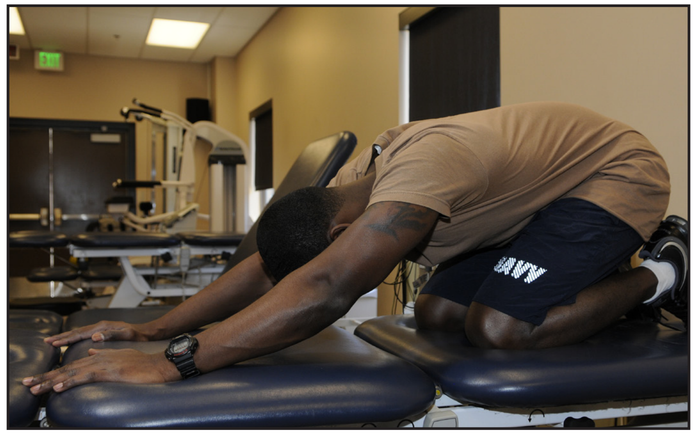
Scalene Stretch

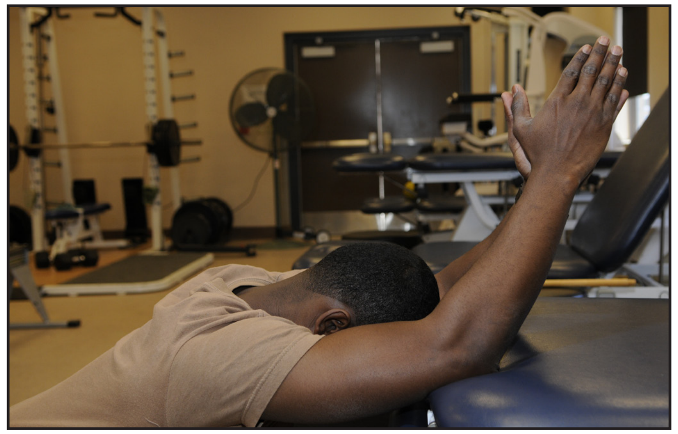
The neck muscles are instantly put to the test when candidates are asked to carry boats on their heads. Nerve injuries often originate from the neck, and this stretch provides flexibility to these muscles to prevent nerve compression.



Lat and Prayer Stretch

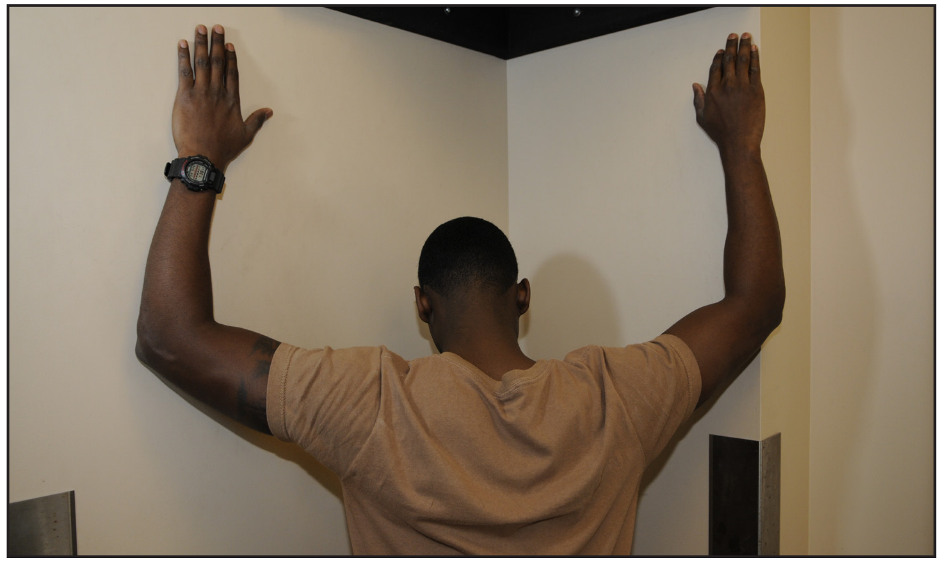
Tight upper back muscles prevent students from maximizing their overhead reach. This can lead to shoulder injuries during log PT. These stretches can be performed sitting with elbows on an elevated table (left) or kneeling (right). The stretch should be felt on the outside of the armpit and into the back.





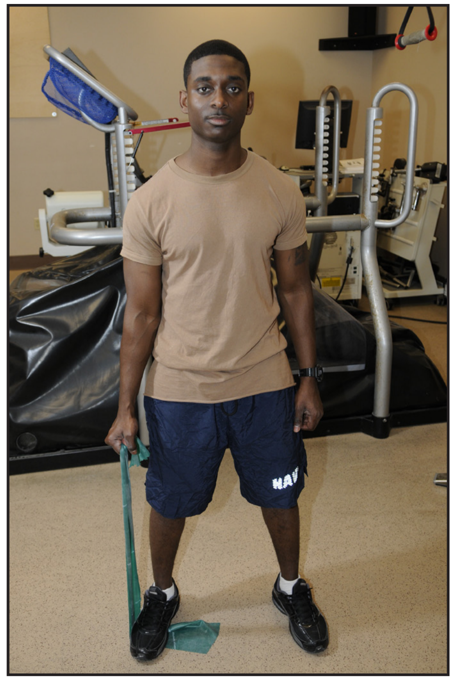
Pectoral Stretch

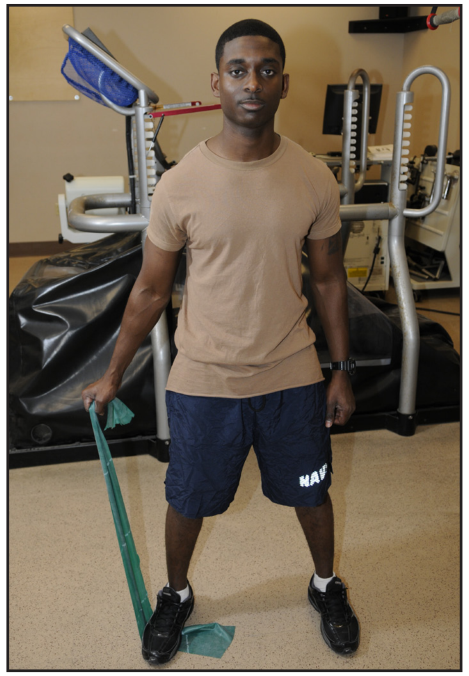
Due to the high volume of push-ups, pectoral muscles become strong and tight limiting shoulder range of motion and making the joint vulnerable to injury. This stretch should be performed in a corner so both shoulders can be stretched. Stretch should be felt in the chest, and arms can be moved up and down to change where the stretch is felt.



Thumbs-Down Shoulder Strength

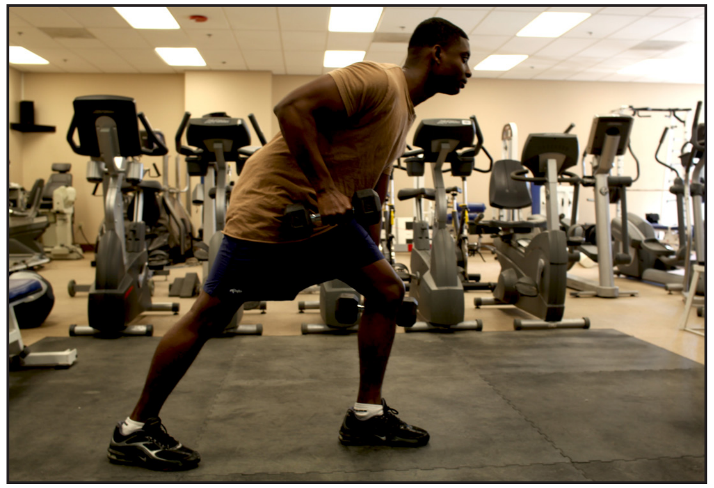
Perform exercise with a rubber band or a cable machine. Arm should be oriented 45 degrees from midline of the body with thumb pointing down. Raise arm to shoulder height. This exercise will strengthen a commonly injured muscle on the top portion of the shoulder and should not be painful!

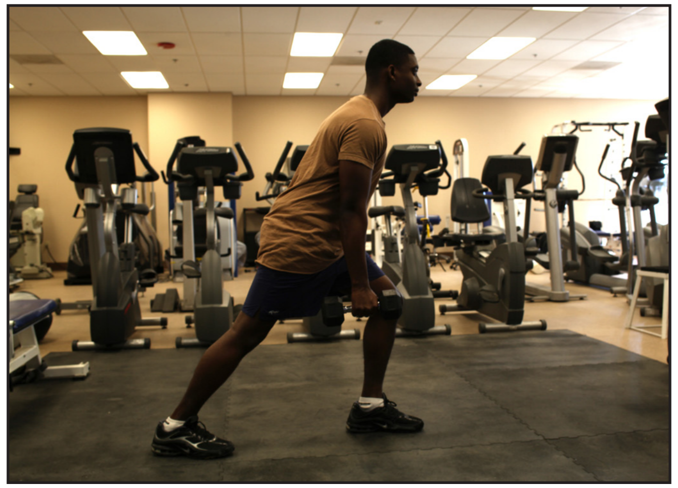




Lawnmower Pull (Mid Back)

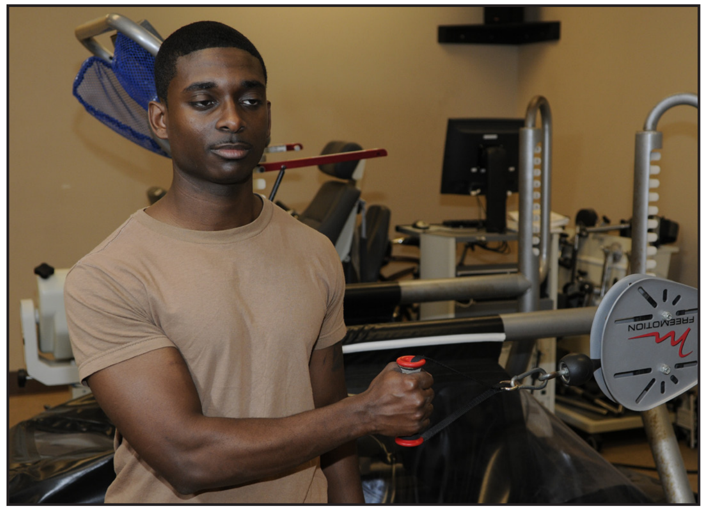
Perform exercise with a rubber band or a dumbbell. One arm at a time, and stagger your feet for balance. Lean forward with your back straight, and with a rowing motion, pull weight back towards your side. Make sure to cover the full range of motion, and your shoulder blade should move toward the center of your back.

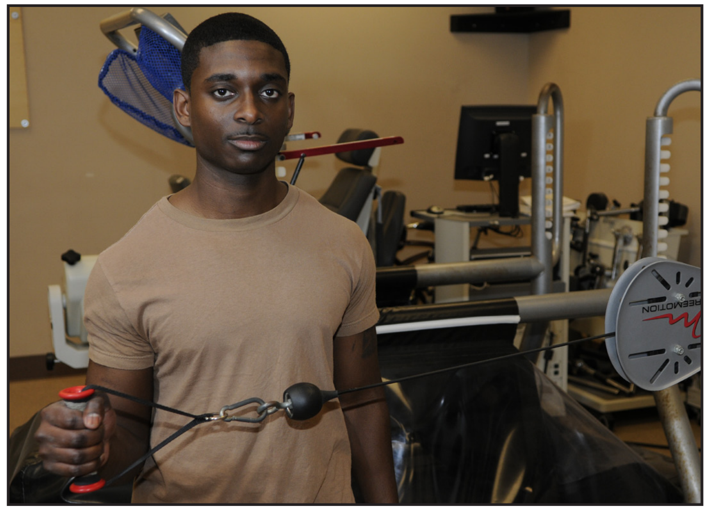




Shoulder External Rotation

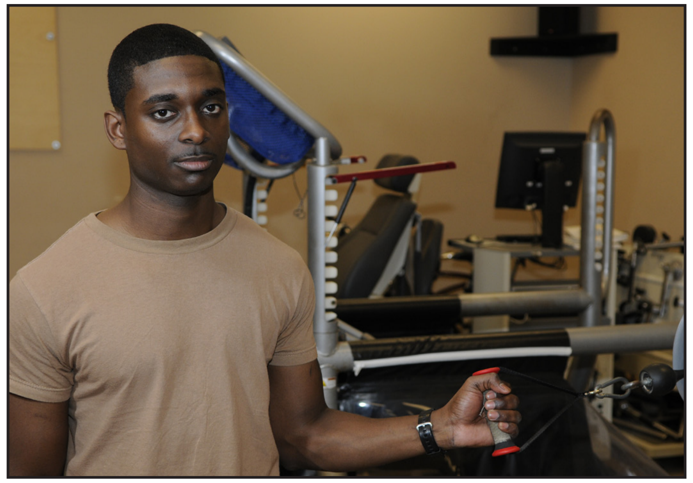
Perform this exercise with rubber bands or a cable machine. Start with your hand grasping handle across your body with your elbow firmly against your side. Pull the cable away from your body while maintaining contact between your elbow and your side. Use a rolled up towel to hold between elbow and side. If the towel falls while performing this exercise, your elbow is leaving your side, and you are performing this exercise incorrectly.

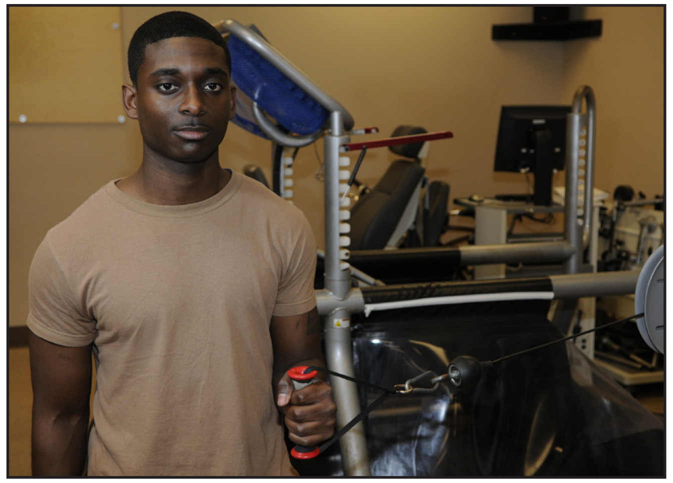




Shoulder Internal Rotation

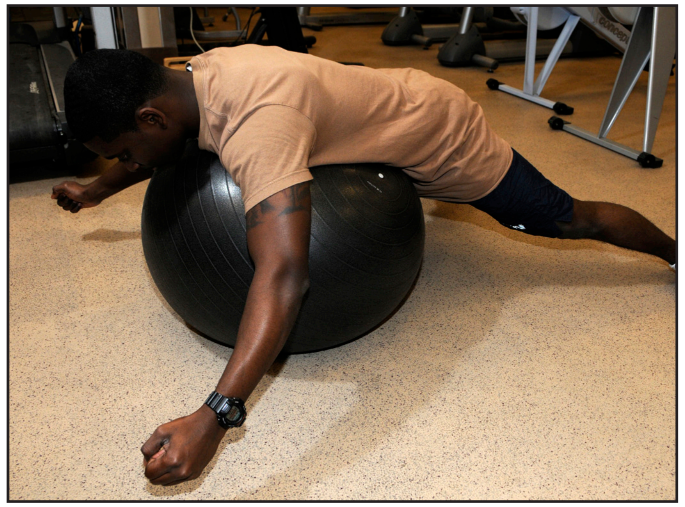
Perform this exercise with rubber bands or a cable machine. Start with your hand away from your body and elbow firmly against your side. Pull weight towards body, stopping once your hand is directly in front of you. Keep your elbow against your side throughout the exercise. Again, use a towel against side if needed.

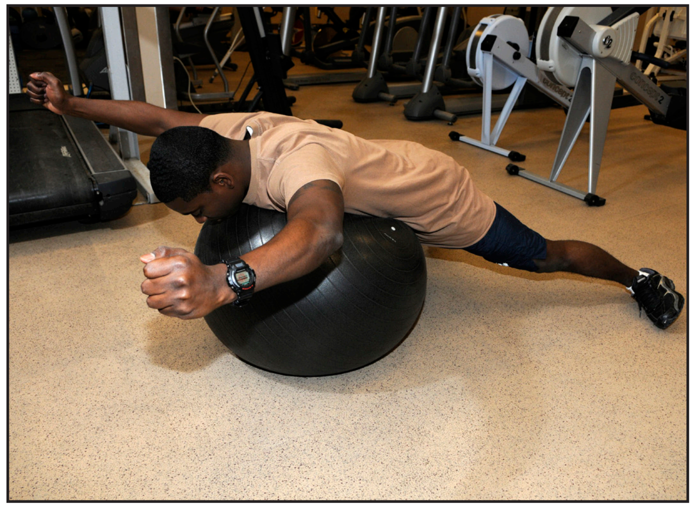




The "Y" Exercise

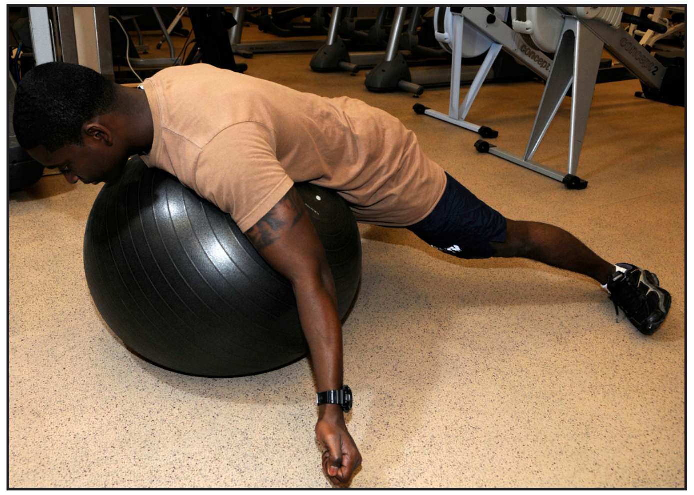
This exercise should be performed on your stomach while lying on a table or exercise ball. Start with arms hanging in a Y position below your body, and finish with them held in the air while maintaining the Y position. Elbows should be kept straight, and thumbs should point up. This exercise should be felt in the lower trap, or middle of your back.

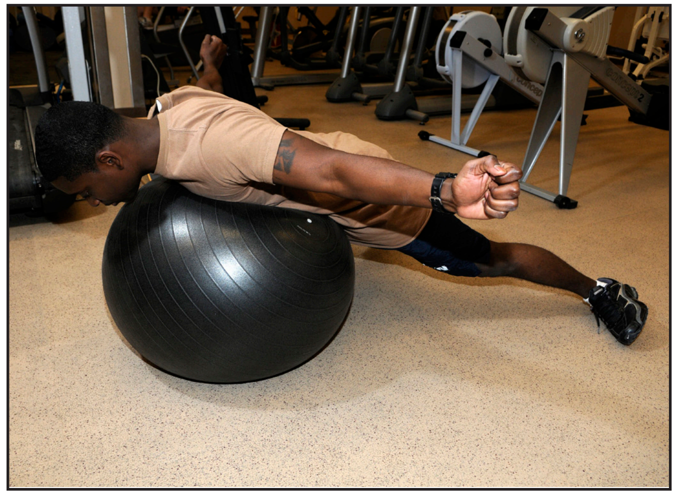




The "T" Exercise

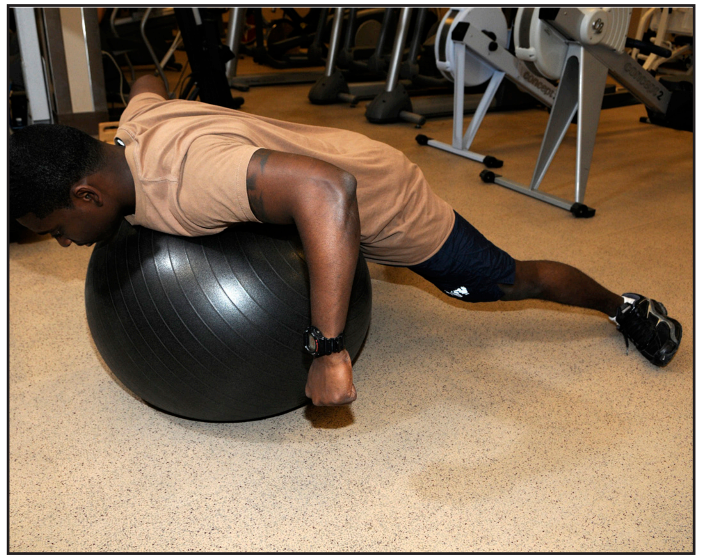
This exercise is performed the same way as the Y exercise, only your arms are held straight in a T position away from your body. Begin with the arms hanging in the T position, and lift your arms up while you pinch your shoulder blades together. Keep your thumbs pointing up. This exercise should be felt between the shoulder blades in your middle trap.

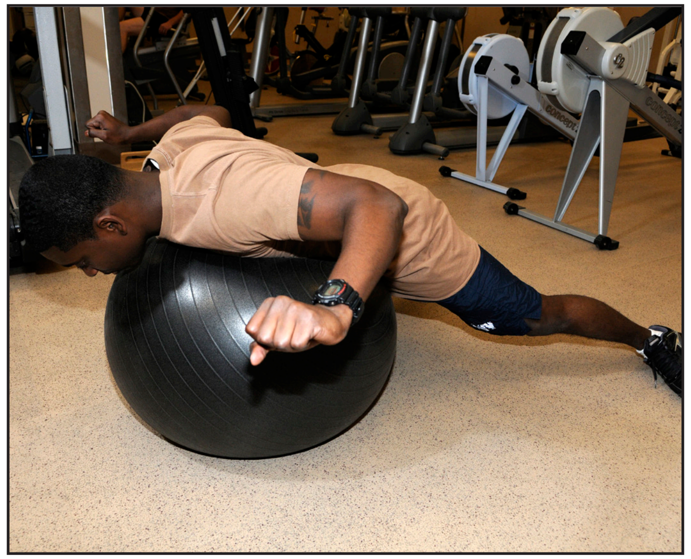




The "W" Exercise

This exercise is performed in the same position as the "Y" and "T" exercises, only you will begin with your elbows bent, hands toward the deck, and shoulder 90 degrees from your side (see picture). First, pinch your shoulder blades together, and then rotate your shoulder so your hands move upward while maintaining a 90 degree angle at the shoulder. This exercise targets the rotator cuff, middle trap, and rhomboids.





Lower Extremity Injury Prevention

Stretching Exercises

- **Hold each for 30 seconds**
- **Repeat 3 times**
- **Perform 2 times a day**

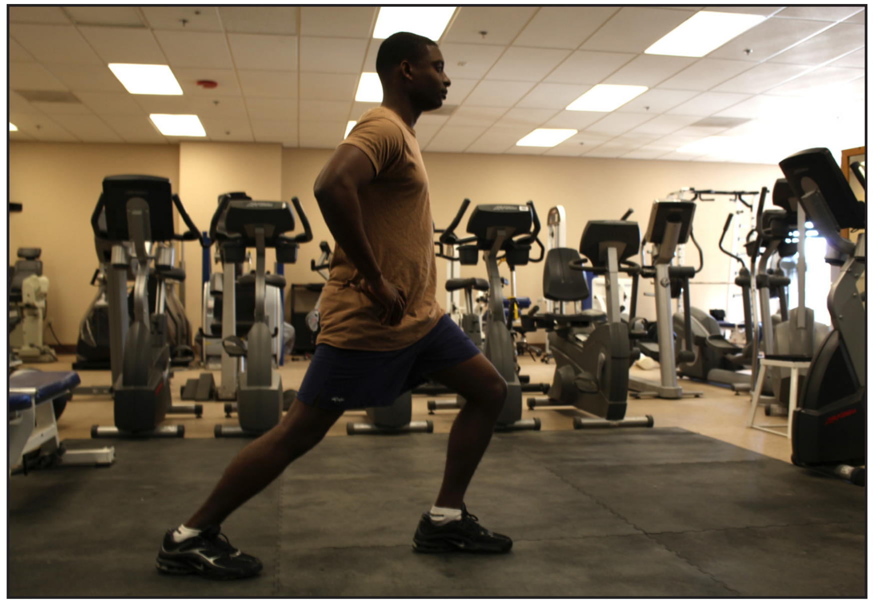
Stretches should NOT be painful!

Lower extremity injuries are also very common at BUD/s. A balance of strength and flexibility are very important in preventing common injuries such as ligament sprains, muscle strains, and stress fractures.

- Hip Flexor Stretch
- Monster Walks
- Terminal Knee Extensions
- Calf Stretch
- IT Band Stretch
- Hamstring Stretch
- Dynamic Stretching

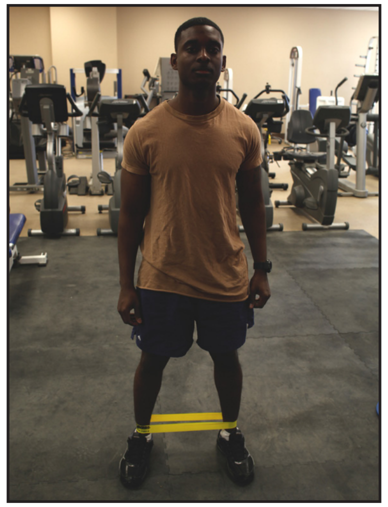
Hip Flexor Stretch

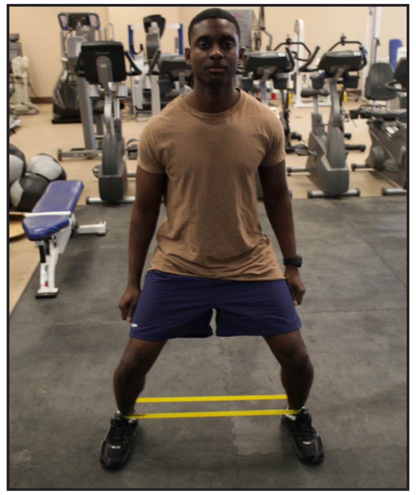
To stretch the hip flexors, get into an upright lunge position, with your front knee bent and your back knee straight. Keep your back straight and lean forward while contracting your buttocks muscle. If stretch is not felt in the front of your hip, rotate torso away from the front leg.



Monster Walks

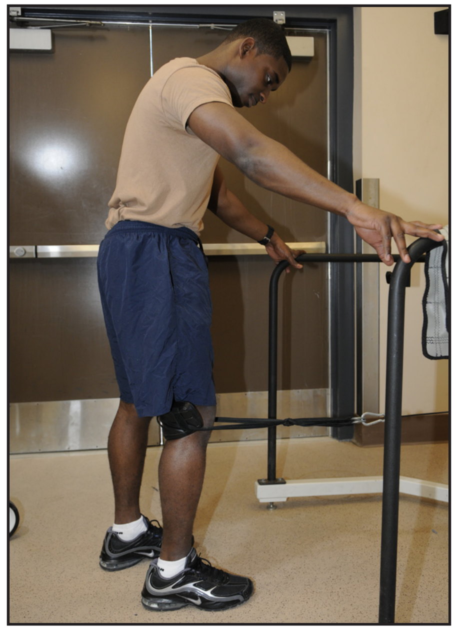
For this very important exercise, tie a rubber band around your ankles. Lower slightly into a squat position, and side step while maintaining a straight back. Make sure your side steps are controlled and slow. Make sure to switch directions. This exercise can also be performed facing forward: step forward with one foot, and before placing foot on deck, bring foot to the side and in front of you at a 45 degree angle from the starting position. Repeat with other foot as you walk forward. This exercise should be felt on the outside of your hips.

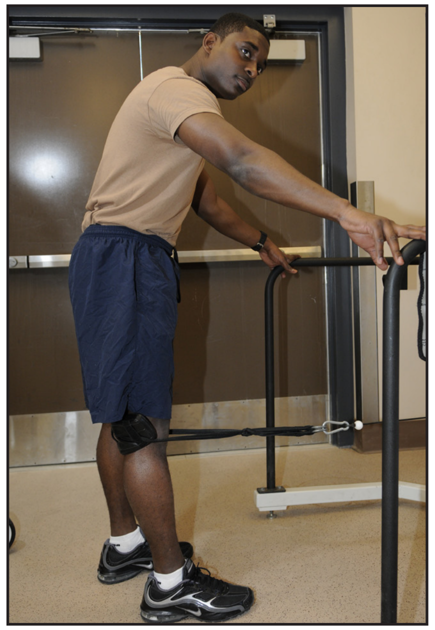




Terminal Knee Extensions

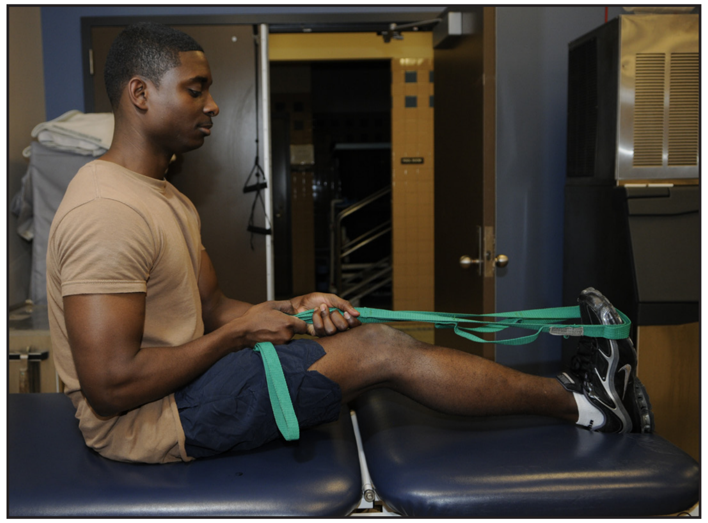
This exercise is performed with a rubber band or a cable machine. Begin by wrapping the rubber band behind your knee. There must be tension on the band throughout the exercise. With the foot planted on the deck, bend the knee, and then straighten the knee while concentrating on contracting the inside quad (tear drop muscle). This exercise is very important for kneecap pain.

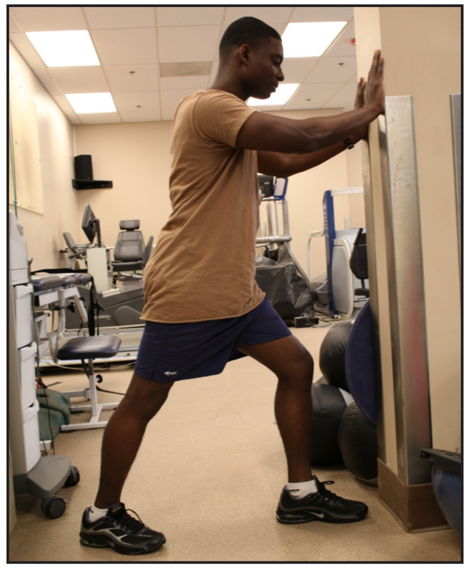




Calf Stretch

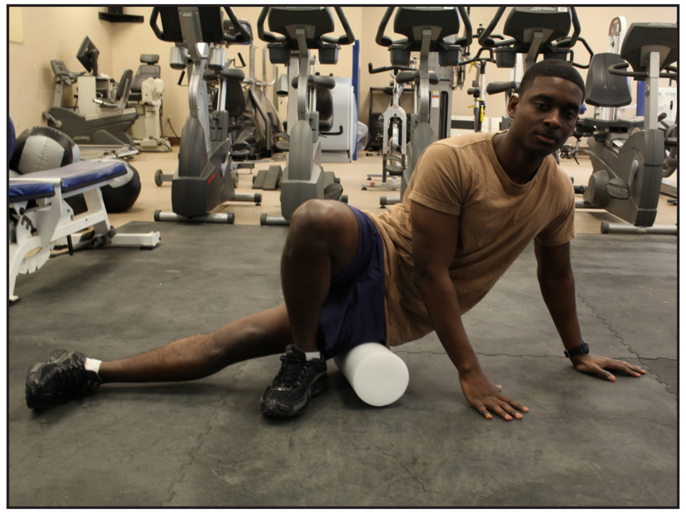
This stretch can be performed leaning against a wall or sitting. When sitting, use a belt or stretching strap around the bottom of the toes/foot. With knee straight, pull toes toward you. Perform the same stretch with the knee bent to target a different muscle in the calf. When doing this against a wall, keep your heels on the deck for both the knee straight and the knee bent positions.

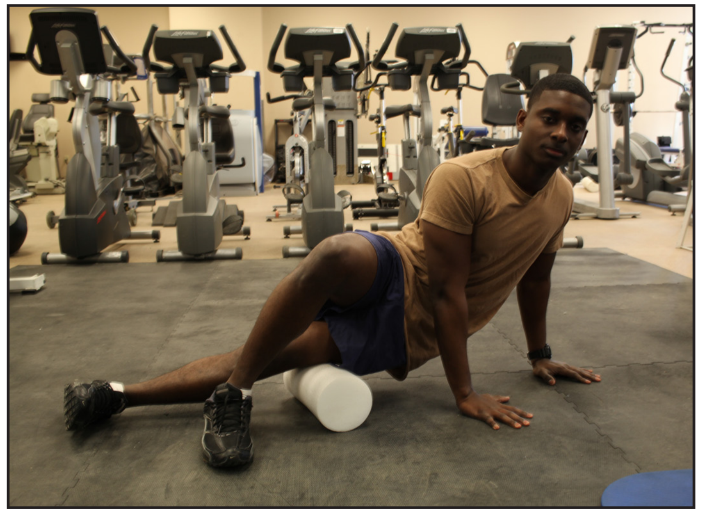




IT Band Stretch

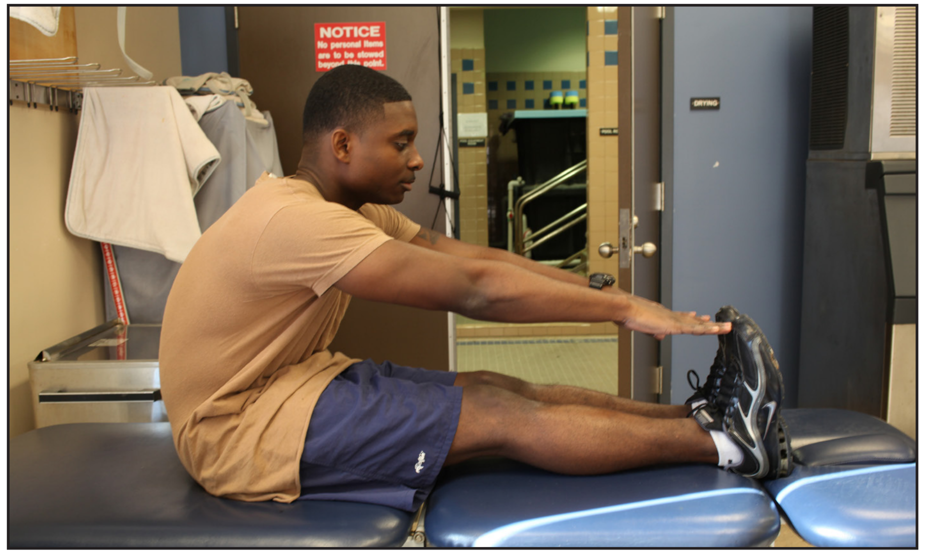
The best way to stretch the IT band is to roll it out with a foam roller. Conventional stretches do little to stretch this thick tissue located on the outside of your leg. Lie on your side with the roller under your knee. With your full weight on the roller, slide your leg over the roller up to your hip. Repeat 7-8 times. Make sure you cover the entire area from the top of your hip to the very bottom of your knee.





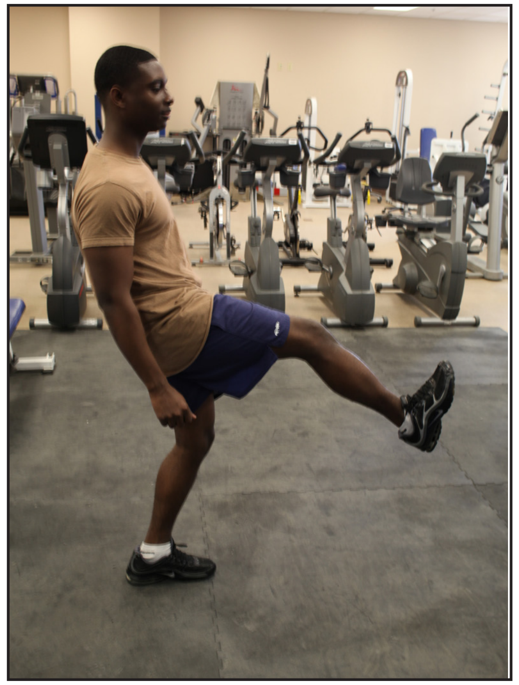
Hamstring Stretch

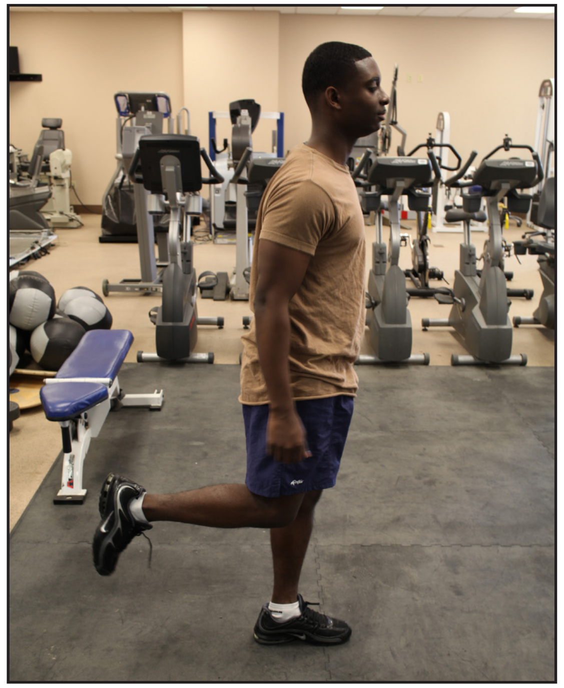
Stretch your hamstrings on a table one leg at a time. Keep the knee straight, and bend forward at the waist towards your toes. Keep your back straight.



Dynamic Stretching

Performed before running during warm-up. Jog lightly in place while you do an exaggerated kick out in front with your knee straight for hamstring flexibility. Then kick your heels back to reach your buttocks. This will dynamically stretch the front of your thighs.





Run Training

Naval Special Warfare Run Training

By Mike Caviston, Director of Fitness, NSWCEN

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Editor's Note

This content was originally posted by Mike Caviston in an online form. All I have done is format his material into a printable document. Any edits I have made are for readability, but none of the content has been changed.
Source:
https://www.sealswcc.com/forums/forum/fitness/run-training/151-running-start-here

Run Training: Start Here

Over the past couple of years, I have posted a lot of material on training and nutrition and answered a lot of specific questions, which has been lost to public view as the SEALSWCC.com forum has been upgraded. I will use this thread to re-post previous items related to common topics and FAQs. I will also try to consolidate other information sources and links to other materials on the Web I think are relevant to SEAL or SWCC candidates. Anyone participating on this forum should begin by thoroughly reading the **NSW Physical Training Guide** (PTG). While I provide information as Director of Fitness for the Naval Special Warfare Center, I welcome feedback and other points of view. This thread will remain locked, but feel free to post comments or questions in other threads.

Running is the most critical performance for success in the selection pipeline. Successful candidates exhibit greater running ability than unsuccessful candidates, and the difference is greater than for any other fitness variable that has been measured (including swimming, calisthenics such as push-ups, sit-ups, and pull-ups, and measures of strength including bench press and deadlift. Ironically, the "Strength Training: Star Here" thread is viewed twice as often as the "Running: Start Here" thread). I strongly encourage serious candidates to review the training advice for running provided on this forum and to implement it as completely as possible.

General FAQ

Some general comments addressing frequently-asked questions related to running:

- Interval training is an extremely valuable training format, but your program shouldn't consist solely of high-intensity intervals. In addition to 1-2 weekly Interval sessions, add liberal amounts of continuous, prolonged, moderately-paced ("LSD") sessions.

- Barefoot running may be a useful part of training, to increase strength of tissues in the foot and encourage efficient running technique. It is not appropriate for everybody (e.g., those with flat feet), so use caution. If you choose to use barefoot running, it should be added to your routine in small amounts, gradually, paying close attention to signs of excessive stress or developing injury. I recommend appropriate running shoes for the majority of training mileage.

- There are no simple or blanket recommendations regarding running technique. The issue of heel strike has received much discussion on the Internet and in fitness magazines. Techniques/programs such as POSE, Chi, and Evolution running have been popular. These programs, while providing some useful recommendations, mandate technical modifications that may ultimately do more harm than good. If you run comfortably, with no history of injury, and are making progress towards your PST goals, don't feel compelled to tamper with your running style - regardless of what style you are currently using. If you are not a comfortable runner or have experienced many injuries while running in the past - consider making some technical modifications but do so cautiously, gradually, and paying attention not to make an existing problem worse or trade one problem for another. For example, historically the BUD/S medical staff has noted increased Achilles tendon injuries among students who have claimed to train using the POSE method.

- Candidates often express an interest in running with boots. Opinions have varied among members of the NSW community regarding the pros and cons of this practice, and with no hard data it is impossible to give definitive advice. Simply wearing boots periodically, to break them in and toughen the feet, is generally regarded as beneficial. The practice of training (performing conditioning runs) while wearing boots is more controversial. I recommend no more than an occasional short run while wearing boots, just to get an idea of what it feels like and how it affects your running mechanics and speed. In my opinion the potential risks outweigh the possible benefits of frequent or prolonged running in boots. The potential risks include greater injury and reduced benefits of training (the goal of training is to run faster while boots make you run slower).

- Candidates frequently express interest in running while carrying weight. This is another case where the potential risk of injury outweighs any potential training benefits. However, an occasional ruck march with a manageable amount of weight for a reasonable distance should be beneficial. The distinction is to walk or hike, not run (one foot stays in contact with the ground, even if you walk briskly). Avoid the impact to shoulders, back, and knees created by running with a weighted pack.

- In the selection pipeline there is frequent running in soft sand. This is physically demanding and even good runners with no prior experience in sand tend to struggle, so early exposure in training is desirable. However, don't overdo it. Too much exposure may create stress that contributes to injury, and running in sand is necessarily slow which limits the development of speed. A good compromise is to include a couple of miles of soft sand running into longer training runs on roads, trails, bike paths, etc. A good strategy is to include various terrains on different training runs (soft sand, hard pack dirt, pavement, grass; also hills as well as flat courses).

- Use cross training to complement and enhance your run training. In addition to swimming, other rhythmic activities that use large muscles (such as cycling, rowing, elliptical machines, stair climbers, etc.) will develop your aerobic fitness. Use these activities to add training volume while keeping your running mileage at safe levels; to maintain fitness while recovering from an injury; or just for variety. Use a treadmill if it is not possible to run outdoors, or to simulate running uphill.

- If you live where it gets cold and snowy, you can still implement a successful running program during the winter months if you take care to dress appropriately and are careful of slippery or snow-covered surfaces. Know the local conditions and know your limitations.

A couple of useful links to material related to endurance training:

http://onlinelibrary.wiley.com/doi/10.1113/jphysiol.2007.143834/pdf

(Provides descriptions of physiological factors that determine endurance, including VO2 max, lactate threshold, and economy.)

http://sportsci.org/2009/ss.htm

(Provides context regarding training intensity and volume, and high performance for endurance activities.)

Barefoot Running

Several months ago, someone on the old forum asked a few questions after posting the following link to an online article about barefoot running:

http://www.dailymail.co.uk/home/moslive/article-1170253/The-painful-truth-trainers-Are-expensive-running-shoes-waste-money.html

I wrote the following in response:

"Running barefoot and running on the forefoot (as with POSE running) has become all the rage among fitness enthusiasts. But as with nutrition and overall workout programs, people are often quick to jump on the bandwagon and buy into the marketing hype, anecdotes and testimonials without looking for valid clinical evidence supplied by unbiased research. I taught running biomechanics to university students for years, and since working in NSW have been in contact with numerous researchers as well as the doctors and therapists who treat running-related injuries of BUD/S students and active duty SEALs. My perspective applies specifically to candidates for SpecWar schools such s BUD/S. I believe that small doses of barefoot running and attention to foot strike while running, if not necessarily making you the fastest runner, may reduce injuries and make you more comfortable and efficient as a runner. (SEALs don't have to win marathons but they have to be able to cover long distances faster than most recreational runners, and be durable over a lengthy deployment.) But you have to explore these issues cautiously and carefully because there are clearly risks associated with going overboard.

"I believe small doses of barefoot running can be useful to strengthen the tissues of the foot and modify running technique to a more efficient style. Begin with 100-200m on grass or firm sand, staying relaxed and not worrying about speed. Slowly and progressively increase barefoot distance, paying close attention to any signs of strain or injury and backing off when necessary. You may eventually get to the point where you can do short conditioning runs or post-workout cool-downs in bare feet, but don't make that the focus of your training. Apply the mechanics you practice when barefoot to running with shoes. I personally strive for a midfoot landing style. That means that when I land in firm sand, I look for a footprint that depresses equally from front to back, not striking with the heel but not landing exclusively on the forefoot. I've read Romanov's book on POSE running and I think it has some helpful information, though it is not clear to me exactly how much pressure Romanov expects us to put on the forefoot. But many people interpret POSE running to mean the heel never touches the ground, and that seems to be a recipe for injury. The authorities I have consulted feel that while strict POSE running may cut down on some injuries (e.g., knee) it will increase injuries to other tissues such as the Achilles (yes, even after doing all the pre-conditioning exercises and following progressive mileage increases). Overall, I prefer the descriptions of foot strike by Dryer in the book Chi Running. But I have to emphasize, as strongly as possible, that you must be careful and proceed slowly when attempting to modify your running technique. I think overall there is good evidence that fewer injuries are associated with midfoot vs. heel striking. But what isn't clear is whether a lifelong heel striker can successfully change to midfoot striking. I think it is possible, but unfortunately there is no clinical evidence to support that position. Some experts feel you will cause more harm than good by messing with an athlete's running style. There isn't enough data to come to a consensus one way or the other, so please use caution and don't jump blindly onto the barefoot/forefoot bandwagon.

"'Natural' running style is not easily defined. To say that man was designed to run barefoot is to ignore the fact that man wasn't really designed to run at all, at least not on two legs. Evolution did the best with what it had, but a mechanical engineer would design things differently. So an argument can be made that the right shoes can complement the foot to create a unit more suited to running than the foot alone. (Maybe the Tarahumara are an exception, but the rest of us didn't come from that genetic stock or grow up in that environment.) I'm always amused when the example of Abibe Bikila comes up (google Bikila if you don't know who he is, because his story is fascinating and inspirational.) The imagery is dramatic of Bikila tossing away his shoes and going on to win a gold medal in the marathon at the 1960 Olympics in Rome while barefoot, setting a world record. What never seems to get mentioned is that Bikila became the first repeat Olympic champion in the marathon, setting another world record in Tokyo in 1964 - this time wearing shoes. For Bikila, the problem in Rome wasn't that he was wearing shoes, it was that he had the wrong shoes. That's an important lesson. It is true that high price doesn't guarantee quality. (Studies indicate that higher price is associated with more injuries, because people mistakenly assume more expensive shoes are more protective and are less careful about how they run.) Many shoes are over-engineered with more bells and whistles than are needed. But I suggest that choosing the right shoe will enhance training and reduce injury. A minimalist shoe may be a good option for some, but once again, do your homework and don't blindly follow testimonials or endorsements. Review the recommendations found on SEALSWCC.com, especially if you have issues such as flat feet or high arches, and choose your shoes accordingly. Train hard, but train smart."

NOTE: The above was written in 2009, when barefoot running proponents were increasing daily and pressuring others to give up shoes; everyone was wearing Vibrams;

and the book Born To Run would become extremely popular. Currently (late 2015) the popularity has faded somewhat, but there are still plenty of people looking for an edge willing to give up their shoes. My advice is still the same - there may be some benefit to limited mileage without shoes, but be very cautious and careful. Research is still far from providing definitive answers on the effects of barefoot running on injury or performance. Here is a position statement from the American Podiatric Medical Association:

"Barefoot running is a possible alternative or training adjunct to running with shoes. While anecdotal evidence and testimonials proliferate on the Internet and in the media about the possible health benefits of barefoot running, research has not adequately shed light on the immediate and long-term effects of this practice.

"Barefoot running has been touted as improving strength and balance, while promoting a more natural running style. However, risks of barefoot running include a lack of protection, which may lead to injuries such as puncture wounds, and increased stress on the lower extremities. Research is ongoing in regards to the risks and benefits of barefoot running"

Substitute Activities

Previously asked questions related to substitute activities:

Q: What if I get injured and need to stop running for a while. Can anything replace running.
A: Occasionally a minor injury will pop up and you will need to miss a few running workouts. Aches and pains are going to occur and sometimes we just have to gut it out. But if a true injury has occurred or is about to occur, it would be better to be safe rather than sorry and not run until you have healed sufficiently to resume running without causing further harm. Or, maybe you are spending some time where it is not safe or practical to run. In the meantime, choosing an alternate aerobic/cardio activity to maintain your general fitness will be necessary until you can resume your running program. Anything that uses a large muscle mass, and can be performed continuously, would be appropriate. Swimming satisfies that requirement, and if you are unable to run one solution is to spend a little extra time in the water. Just be sure not to increase your swim mileage too dramatically and cause injury from swimming. As for other appropriate activities, cycling and rowing are good choices; stair climbers, elliptical machines, Versaclimbers, skating and cross-country skiing could all be used, depending of course on

what is available to you and what your injury allows you to do. Just try to replicate the structure of your usual running workout, that is, the approximate time and intensity of your scheduled LSD, CHI or INT workout.

One other important point: substituting another activity for running will help you maintain fitness, especially for the short term, but it is not ideal for improving running performance. So when you get back to running, don't try to pick up where you would be if you hadn't been injured. My general rule of thumb is, for every week of the PTG schedule that you miss, go back two weeks and resume from there. It doesn't matter how quickly you get in shape before BUD/S, only that you are in good shape once you get here.

Q: How should I train for running in the winter when it is cold and snowy.
A: I would expect many people can still train outdoors in winter, taking care to dress properly and making sure your footing is safe (be careful of ice or uneven surfaces hidden by snow). LSD runs shouldn't be too bad but some people might find it hard to get good CHI or INT intensity in cold temperatures. Cold air is dry and may aggravate your throat (harder to breath) or sinuses (bloody nose). If it is necessary to train indoors, try to select an activity that allows you to come closest to mimicking your scheduled workout. A treadmill would probably be a good option, but other cardio activities could work well, including cycling, elliptical, stair climber, Versaclimber, or C2 rowing machine. Do whichever activity allows you to work at your desired intensity/duration. Do the best you can with what you have, and don't sweat things that are out of your control (like the weather). Good luck.

Cross Training

Cross Training Considerations:

*BUD/S or BCT candidates need to be running and swimming 3-4 times a week (minimum) on a regular basis.
*When injured and unable to run or swim, substitute an alternate activity that doesn't aggravate the injury. Choose an activity that utilizes large muscle groups and can be performed in a rhythmic, continuous manner. Examples include cycling, elliptical or stair climb machine, and rowing machine.
*These activities can also be used to supplement (not replace) your regular run/swim training. Use exercises like cycling or rowing as part of your warm-up or cool-down, or as

separate workouts. Lust be sure to avoid overtraining and add these activities slowly and gradually to your existing routine.
*Some pipeline-specific activities you might add to your regular run/swim schedule: swim and run (or run and swim) in the same workout back to back (may take a little logistical planning). Hike (not run) with a pack, especially on trails or sand. In-line skating (or ice skating or cross-country skiing) are good because they really work the hip abductors (gluteus medius) which provide support and stability when running in soft sand.
*Sports with a running component, such as basketball, soccer or tennis, might also supplement regular training. Because of their stop and start nature, they might not ne the best choice purely for cardiovascular development, but they offer other benefits related to fitness, motor skills, and team building.
*In general, lots of activity is good!

Warming Up

Warming Up Is Important

As I was preparing for an interval run, I thought it might be time to revisit and re-emphasize the importance of warming up before any workout, but especially those workouts that involve high intensity. The Physical Training Guide includes a section on warming up and cooling down; I encourage everyone to review the PTG regularly. Here are a few additional thoughts on warm-ups:

*A proper warm-up reduces the risk of injury and allows you to perform more quality work, leading to better training adaptations.
*A good warm-up by itself encompasses all the elements of a good workout (a mix of steady-state effort and high-intensity bursts). You know you are doing it right if an outside observer mistakes your warm-up for the actual workout.
*Warm-ups by themselves provide a good training stimulus. On days when you are feeling a little overtrained and want to throttle back to recover a little more, a good strategy is to go through your warm-up routine two or three times and call it a day.
*Don't ever compromise your warm-up. On days when you are pressed for time, shorten your workout from the back end, not the front. For example, if you had planned to run 8x400m, you should perform your regular thorough warm-up, take adequate (active) recovery after each interval, and stop after 4, 5, or 6 intervals if you run out of time. Maintain quality; get in the full workout next time.

There are different strategies and formats you could use to warm up. You may want to include another activity like cycling as part of the warm-up, perform some calisthenics, or just run. Just make sure to take long enough to get warm and sweaty, and include several high-intensity bursts. You may get concerned you will be too tired to execute the workout, but that's right where you need to be. A general format I've used with students includes a few minutes of dynamic stretching (walking lunges, straight leg kicks, butt kicks, high knees, carioca, etc.) followed by a few accelerations or striders (50-75yds). Maybe a little jogging, and the option for some static stretching if desired (e.g., maybe you have a tight hamstring or calf that needs a little special attention). The whole process takes about twenty minutes from starting the warm-up to starting the first interval.

Running At BUD/S

Running At BUD/S
(Originally posted September 21, 2009)

Preparation for the SEAL PST and BUD/S must include a sound running program. Performance on times runs of varying distances (1.5 miles, 3 miles, 4 miles) correlates well with probability of completing Hell Week in a fairly linear fashion (faster means higher probability of completion). Students in BUD/S must complete 4-mile runs in progressively faster times throughout First, Second, and Third Phases. Students in Third Phase must complete a 14-mile run. Students must run dozens of miles per week moving to and from different locations at the BUD/S compound just to do other training evolutions like swimming or carrying boats or even to get chow at the galley. The running program detailed in the NSW Physical Training Guide is designed to develop the endurance and speed to excel on the PST and the necessary abilities to complete BUD/S. The NSW Prep conditioning program which candidates complete following boot camp at Great Lakes prior to shipping to Coronado provides the opportunity to further develop running fitness.

Before a BUD/S candidate can ship to Coronado from Great lakes, he must demonstrate running proficiency by passing rigorous exit tests. Students who begin BUD/S have demonstrated they are solid runners. Yet some students struggle, at least initially, with the running evolutions at BUD/S. How can this happen? Most likely they are affected by the demands of performing in a new environment under novel circumstances. For example, after months of training in running shoes, BUD/S students run in boots at all times. Despite what you may have read elsewhere, and the apparent logic behind preparing early, the various medical and conditioning experts at the Naval Special Warfare Center recommend that candidates limit training in boots prior to beginning

BUD/S. Wear appropriate running shoes (you can find guidelines at SEALSWCC.com) for the majority of training, and restrict running in boots to short, occasional sessions. Students wear boots while at Great Lakes except for running and PT, so they get a chance to break them in and condition their feet, and will begin to wear them during running and PT during NSW Orientation. The transition will go smooth for students who arrive with a solid conditioning base and a natural, efficient running style.

A major adjustment to running at BUD/S is the soft sand that forms the terrain of many conditioning runs and training evolutions. Many students arrive having put in plenty of miles on roads or tracks but never having run on a beach or other sandy surface. BUD/S candidates who have access to beaches or other sandy terrain may take advantage of the opportunity to incorporate the soft surfaces into their running program. Be aware that running on sand is more stressful than many people would expect. We tend to equate soft with cushion and low impact, but the flip side to the coin is soft sand offers little support and too much give during propulsion. In short, running in sand is quite stressful and (as with all aspects of training), candidates should add sand running to their overall mileage gradually and progressively, beginning with a modest tolerable amount such as half a mile or less. The percentage of total miles on soft sand should initially be limited to no more than 10-15%. Eventually, as conditioning improves, sand mileage can be increased to a larger percentage of total mileage, but as a general rule of thumb, limited to no more than 50% of total miles, with one third of total miles probably a good proportion. It is important to keep a balance between getting familiar with soft sand and running on firm surfaces to allow appropriate speed development.

More so than running on solid surfaces, running on sand requires stabilizing work from the lateral muscles of the hip such as the gluteus medius, and the peroneus muscles of the lower leg. When these muscles are weak or become fatigued, performing on unstable surfaces causes misalignment of the lower extremity that may result in pain and injury. BUD/S candidates should have a proactive strategy for increasing the strength and endurance of these muscles before entering the official NSW training pipeline. There are a wide variety of exercises and activities that can be incorporated into a general conditioning program. Examples include:

- Standing hip abduction using a cable machine, elastic bands or rubber tubing.
- While lying on one side, perform hip abduction against manual resistance from a partner, or using ankle weights.
- Do the calisthenics exercise known as the "dirty dog" or "fire hydrant": begin in a stable position on all fours (hands and knees), and externally rotate one hip out to

the side, keeping the hip and knee bent to 90 degrees, until the thigh is parallel to the ground. Perform the desired number of repetitions and switch to the other hip.
- Perform side lunges using body weight or while holding dumbbells.
- Use a slide board, or do lateral skater's hops back and forth to points a couple feet to either side of your starting position.
- Do short sprints that require zigzag or cutting movements, or do carioca maneuvers.
- Use equipment that requires balance and stability, such as wobble boards or BOSU trainers.
- Do in-line skating, ice skating, or cross-country skiing.

As with all aspects of fitness, start at a manageable level and be progressive over time. Vary routines to emphasize both strength and endurance. Be aware of the effects of adding new exercises or routines to your overall program (including running and swimming). Work hard, but also be creative and have fun.

Postscript - SWCC candidates run on the same beaches and perform many of the same evolutions as BUD/S students. I Don't want to minimize the importance of preparing for SWCC, so future Boat Guys need to follow these recommendations as well.

LSD - Long Slow Distance

Is Long (Slow Distance) Wrong?
(Originally posted November 9, 2009)

Endurance is one of the physical attributes required to succeed at BUD/S. The NSW Physical Training Guide features workouts to develop running and swimming endurance as a means of maximizing performance on the PST and preparing candidates for the rigors of the various training evolutions performed at BUD/S. The program features workouts using short interval (INT) and long interval (CHI) formats as well as sessions of prolonged, continuous activity (LSD). The interval formats are essential to the program and a critical training tool to maximize performance. I am a huge advocate of interval training. But my firm recommendation to candidates following the 26-Week program in the NSW PTG is to keep the number of interval sessions limited to one INT and one CHI session per activity (running and swimming), and gradually increase the length and number of LSD sessions as fitness develops. Many candidates attempting to follow the PTG have heard from one source or another that LSD training is either not useful because it is not demanding enough, or actually detrimental to performance because it diminishes the effectiveness of strength and speed training. I want to address those issues here.

The use of the term "LSD" may be confusing or misleading for some. While it does stand for Long Slow Distance, it only means "slow" relative to the paces you use for INT and CHI workouts. The pace has to be slow enough to allow you to complete the required distance. But "relatively easy and relaxed" doesn't mean "no effort" and doesn't mean that you won't sweat. A certain amount of intensity is required before adaptations will occur. Rather than being "slow" or "easy", LSD training can actually be quite challenging, and I prefer to think of LSD as Long Steady or Sustained Distance.

A simple and accurate way to determine the intensity for LSD is to use the Talk Test. Pay attention to your breathing, and choose a pace that causes you to breath somewhat hard but not too hard. You should be able to talk in short/choppy sentences, not gasping uncontrollably but not making long winded speeches either. (Some people prefer to monitor their heart rate during training, which requires laboratory stress testing for complete accuracy, but I believe monitoring your breathing is simpler and just as effective for gauging the right pace to enhance endurance without overextending yourself). As your fitness increases, you are able to work at a greater percentage of your max for extended periods without gasping for air, so the Talk Test is self-adjusting relative to your ability.

Endurance training may have some slight negative impact on strength and speed. As the muscles receive multiple signals from various training stimuli (LSD workouts, lifting heavy weights, sprints) some of the signals will conflict with each other. An Olympic weightlifter or hurdler trying to maximize muscle mass or contraction velocity would want to significantly limit LSD training. But elite athletes operate in an arena where specialization is required, and the difference between winning and losing is just a tiny fraction of a percent of actual performance. For BUD/S students and potential SEAL Operators, it is essential to be well-rounded and capable across the entire physiological spectrum. This means being able to move effectively in short bursts and lift heavy weights, but also able to cover long distances over rough terrain and still have a steady enough pulse to shoot straight when you reach the target. It also means having the ability to recover quickly after a max effort to be able to go again with little down time. Training for such diverse situations requires a little give-and-take, and optimal adaptations won't occur across the board. But realistically, adding a couple tenths of a second to your 40-yard dash while knocking five minutes off your 10K run is a good trade any day.

One common argument against LSD training is that high-intensity interval training is sufficient to substantially increase aerobic capacity (VO2max). This is true and one of the reasons I include INT training in a general fitness program, but a large aerobic capacity is not enough to guarantee ample endurance. The Three Factors of Endurance are aerobic capacity (VO2max), lactate threshold, and economy (the rate of oxygen consumption required to hold a given pace; related to efficiency). Here is a link to a review in the Journal of Physiology for anyone who wants a little more technical information: http://onlinelibrary.wiley.com/doi/10.1113/jphysiol.2007.143834/pdf

Economy is affected by body type (body mass, height, limb length) as well as technique. You can't alter your genetics, but both INT and LSD training can lead to better technique and improved economy (and therefore greater endurance). A large aerobic capacity requires a big strong heart that can pump many liters of oxygen-carrying blood per minute, and the intensity of INT training will stimulate the pumping chambers of the heart to become larger and more powerful, resulting in increased stroke volume and cardiac output. A high lactate threshold allows you to work at a greater percentage of your max for prolonged periods, and to recover more rapidly between shorter, high-intensity bursts. I like to include both INT and LSD formats in training because they complement each other. The ability to recover more quickly/completely between intervals as a result of LSD training allows you to work harder when doing 1/4-mile repeats, for example. The prolonged, continuous nature of LSD training stimulates increased muscle capillary and mitochondria density, resulting in an increased ability to optimize blood flow, remove excess heat and metabolic waste products, and utilize fatty acids for fuel, all leading to increased endurance and more rapid recovery.

The useful adaptations stimulated by proper LSD training are not adequately addressed solely by INT training. Limiting your fitness program to short, high-intensity workouts without corresponding LSD training is like building an automobile with a high-performance, large horsepower engine but a tiny 5-gallon gas tank. You may go fast but you won't go far.

More on LSD: Application to the PTG

(Originally posted December 7, 2009)

In my previous post I confronted the perception that high mileage may be counterproductive to performance and encouraged candidates to incorporate LSD training into preparation for BUD/S. On the other hand, others have asked if there is enough mileage in the PTG to adequately prepare a candidate for BUD/S. Some candidates have looked at the numbers and noted that the NSW Physical Training Guide 26-week program seems to build to a weekly total of approximately 20 miles, which falls short of the 30-40 miles per week that pops up in various sources as a recommendation for preparing for BUD/S. I've addressed this apparent contradiction a few times already, but I want to make a definitive statement here.

The PTG was designed to accommodate untrained but healthy candidates, and a basic premise is to begin training with a moderate workload and gradually and progressively increase the training volume and intensity over several weeks. This is necessary to avoid the common beginner training mistake of attempting too much mileage too soon, often leading to burnout and injury. So the mileage prescribed in the early weeks of the 26-week program is pretty light by the standards of experienced runners or athletes that have been active in a number of sports that include running. But athletes with a solid conditioning base may enter the program at a higher mileage as long as it is consistent with their current fitness and training habits. Please note, this refers to candidates who have actually been following a progressive running program and have actually completed the necessary base mileage; candidates should never enter the program based on what they think, wish, hope, or assume they should be doing.

After several weeks of training with the three weekly running workouts prescribed by the PTG, you might decide to add a second weekly LSD session. I would recommend an unbalanced format that includes a longer session as well as a shorter session (about 50-75% of the distance of the longer session). The pace would be approximately the same for each session; don't do the shorter run at too fast a pace and turn it into a CHI workout. A general target would be to build up to a longer run of 8-10 miles with a shorter run of 5-6 miles. (Note: build up means a gradual increase over time. For example, during Week 13 you might do a long run of 5-6 miles and a short run of 2-3 miles, adding 1/4-1/2 mile to each session each week.) Some experienced, competitive runners may have the background and ability to eventually go even longer than 10 miles, maybe as far as 15 miles or more in a single session. If you have the desire and ability and necessary baseline preconditioning for that kind of mileage, I wouldn't discourage you. But I have no basis for claiming that being able to run comfortably for more than 10 miles will be a significant advantage, so I don't want anyone to feel they absolutely must exceed that distance before starting BUD/S.

Let's do a summary of the total weekly mileage you might achieve while doing one INT, one CHI, and two LSD workouts. Let's not forget to account for the warm-up and cool-down portions of the workouts. INT and CHI workouts require prolonged warm-ups to increase the effectiveness of training and decrease the risk of injury. Post-workout cool-downs (and active recovery between intervals) facilitate recovery. Even LSD workouts should begin with a brief warm-up. See the Physical Training Guide for details.

Don't count these additional miles as part of the specific workouts, but they do affect your overall fitness and should be counted towards your weekly total mileage. I'll use some general numbers for illustration, but your actual numbers might vary to some extent.

Example

INT session: warm-up 2.5 miles; 10 x 1/4 mile for 2.5 miles; active recovery between intervals 1.0 mile; cool-down 1.5 miles; total 7.5 miles.
CHI session: w/u 2.5 miles; 2 x 20 min for 6 miles; active recovery 0.5 mile; c/d 1.5 miles; total 11.5 miles.
1st LSD session: w/u 1.5 miles; LSD run 10 miles; total 11.5 miles.
2nd LSD session: w/u 1.5 miles; LSD run 6 miles: total 7.5 miles.
Grand total, all four sessions: 38 miles.

This comes pretty close to 40 miles per week, and the intensity of the INT and CHI running equated to greater volume than the same number of LSD miles, so we're looking at the equivalent of 40+ miles per week following the format prescribed by the Physical Training Guide. For candidates who build up to this running volume gradually and progressively, and have also maximized their swimming mileage, and are looking to develop even greater cardiovascular endurance, I encourage the introduction of non-weight-bearing activities such as cycling or rowing.

Be sure to incorporate general as well as specific injury-prevention strength training as well as flexibility exercises into your running routine. Review the recommendations in the PTG, see my posts in this and the Strength Training forums, and check out the Injury Prevention Guide and videos.

INT - Intervals

Complete Instructions for PTG Interval Sessions
(Originally posted December 15, 2009)

In recent posts I've been clarifying some issues related to LSD workouts, so I thought this would be a good time to emphasize proper execution of interval (INT) workouts as well. The goal of the INT format in the NSW PTG is to build up to performing 10 x 1/4 mile at the fastest pace that can be sustained for the entire workout. That is very demanding both physically and mentally, but a very effective means of improving your performance on the 1.5-mile run portion of the PST. However, many candidates make fundamental mistakes when executing the INT format regarding the number of intervals they start with; how fast they try to go when just beginning training; how consistently they pace the workout; how well they recover between intervals; and how quickly they try to improve from week to week.

I can never repeat enough the importance of taking a long-term approach, and to encourage candidates to focus on achieving consistent gradual progress over several months, rather than trying to achieve instant gratification and stupendous results right now (because this rapid initial increase is almost certain to precede an early plateau followed by a decline in performance). Week 1 of the PTG's 26-week program begins with four 1/4-mile intervals, at a pace only slightly faster than your recorded pace for a 1.5-mile run. Even if you are an experienced runner and are able to begin following the PTG running more LSD miles than are listed for Week 1, I still encourage you to begin the INT workouts at Week 1 and perform only four repetitions. You should initially shoot for a pace during your 1/4-mile repeats that is about 4 seconds quicker than your 1/4-mile pace during your 1.5-mile run and no faster. For example, if your 1.5-mile time is 10:00, your pace for your first INT session should be about 1:36. A session of four repeats at this pace is probably not going to feel too tough, but that shouldn't concern you at this point. You just want to set yourself up for long-term improvement; eventually you'll achieve some real speed. I've talked with candidates who have become burned out or suffered from complaints such as lower leg pain, and this almost always correlates with doing too many intervals at too fast a pace too early in training. Some coaches would recommend not using intervals at all in the early weeks of training, but I feel it is safe and will lead to better long term performance as long as the prescribed guidelines are followed.

Since the INT sessions for the first few weeks will be relatively short, use the time to establish a thorough and effective warm-up routine. Add another interval to your to your workout every couple weeks according to the schedule in the PTG. Don't worry about increasing your speed until you build up to the full ten intervals. Work on consistency and pacing, trying to run each interval with no more than one or two seconds difference between your slowest and fastest. After you build up to ten intervals, doing them all consistently near your goal pace, you can start working on doing them a little faster every week. Still. don't be in too much of a hurry to go too fast too soon, and keep it steady. It defeats the purpose of the workout if you do the first interval in 65 seconds but shoot your wad, get slower and slower with each repeat and finish with a 2-minute interval. Between intervals, take enough time to adequately recover (about 2 to 2.5 times as long as it took to run the previous interval). Stay on your feet, keep moving, do a little jogging for active recovery, and stretch as needed.

Keep a record of all your sessions. After developing a fairly consistent pace with a steady rhythm, every week try to knock another second or two off your last couple intervals, finishing each workout strong. For example, if the previous week you finished ten intervals at an average pace of 1:30, continue to hold a 1:30 pace for the first several intervals of your next workout but bring it down to the 1:29-1:28 range for intervals 8-9, and then open it up for the last rep. The week after that, start the INT workout at roughly the same pace as your average from the last session and repeat the process all over again. If you are patient, you will eventually see a significant reduction in your times. Taking even one second off your average pace each week for fourteen weeks adds up to a pretty big improvement. If you train smart, you will develop enough experience to be able to push yourself hard from the start but still have enough stamina to finish the whole workout. As training becomes more physically and mentally demanding and it becomes harder to get faster from week to week, you will improve and refine your tactics for dealing with the discomfort and the urge to quit. This application of determination, strategy and goal-setting to achieve a long-term objective using short- and medium-term targets is consistent with the type of mental toughness required to get through BUD/S.

For variety, rather than always doing 10 x 1/4-mile, you can occasionally do alternate formats of the INT session using 200m or 600m intervals as well as the standard 400m (a quarter mile is equal to 400m). For example, do 6 x 600m to work on sustaining your 400m speed a little longer. Another possible format might be 3 x 600m, followed by 3 x 400m, followed by 3 x 200m Use any combination that adds up to no more than 4000m (approximately 2.5 miles). It probably won't be possible to hold your 1/4-mile speed for 600m repeats, so expect to go a little slower, and obviously you would need more time to recover after 600m compared to 400m. On the other hand, for 200m you would be able to go even faster than 1/4-mile speed and take a little less recovery. These occasional variations would let you work on slightly different parts of the speed continuum as well as shake things up mentally. Make sure to do your INT sessions on a firm even surface that is safe (you don't want to sprain an ankle or twist a knee) and fast (after all, it's a speed workout). Trail running or the beach is good for some LSD work but not optimal for INT. A good outdoor track is ideal, but a bike path or similar surface can work (watch out for traffic). Be careful if you use an indoor track, because if it isn't banked properly the tight turns will be hard on your legs. If you are temporarily unable to run for an INT workout (minor injury, bad weather, etc.) follow my general training recommendation (also applies to LSD and CHI) and use an alternate activity to mimic the intensity of the regular workout. Use a treadmill with a slight incline, a stationary bike, or a rowing machine to work as hard as you can for the same time periods it would take you to run your 1/4-mile repeats and spend the usual amount of time recovering.

Finally, remember to put INT sessions in the proper context of total training. As I've discussed previously ("Is Long Slow Distance Wrong?"), INT training is a fantastic tool to improve fitness, but it must be balanced with lower intensity sessions. The "all-out, all the time" approach is counterproductive. That's just a matter of human physiology, and we can't change it, no matter how tough or hardcore we think we are. For anyone interested in a (fairly technical) summary of research that has investigated the balance of training intensity and duration for high-performance endurance athletes, please see the following:

http://sportsci.org/2009/ss.htm

From the article's conclusions:
"Currently, there is great interest in high-intensity, short-duration interval training programs. However, careful evaluation of both available research and the training methods of successful endurance athletes suggests that we should be cautious not to over-prescribe high-intensity interval training or exhort the advantages of intensity over duration."
"HIT should be a part of the training program of all exercisers and endurance athletes. However, about two training sessions per week using this modality seems to be sufficient for achieving performance gains without inducing excessive stress."
"The effects of HIT on physiology and performance are fairly rapid, but rapid plateau effects are seen as well. To avoid premature stagnation and ensure long-term development, training volume should increase systematically as well."

CHI - Continuous High Intensity

CHI Training Format Explained

Questions about the CHI workouts in the Physical Training Guide come up frequently. Everything I could possibly say about CHI workouts has been said in various posts on the Forum, but I will do a summary here. Remember that the basic weekly training format includes one Short Interval session, one CHI session, and 1-2 LSD sessions for both running and swimming. Review the previous posts in this thread for detailed instructions regarding Short Interval and LSD sessions.

A note about terminology: many endurance athletes or coaches would refer to the CHI workouts as "threshold training", and that's fine with me. For reasons I won't go into (I'm a physiology nerd), I don't like the term "Anaerobic Threshold" (often abbreviated "AT").

The workouts themselves are good; I just prefer not to use that name. In the Physical Training Guide, I introduced the term "Continuous High Intensity", or CHI for short. At the time, I wasn't aware of the book by Danny Dreyer called Chi Running, which refers to a style or technique of running, not a training intensity. Unfortunately, that has caused some confusion. Currently, when working with students and staff at the Center, I refer to these workouts as Long Intervals. When I get a chance to do an update of the PTG, that's one of the revisions I'll make.

In the PTG, the CHI workouts are prescribed by time (15 minutes, 2 x 12 minutes, 2 x 20 minutes, etc.) I did this because I figured it would be easier for most people to keep track of time when it might not be possible to accurately measure distance. But you can easily format the workouts by distance if you prefer. For running workouts, some alternate formats that fit into the appropriate range of time/intensity include 3 or 4 x 1 mile, 2 or 3 x 1.5 miles, and 1 or 2 x 2 miles. A single 5K would also be a good workout for this category (think of it as a single long interval), and you might participate in a local race to give yourself some focus, to get used to running in a group, and practice dealing with competition anxiety.

My prescriptions for Short Intervals and LSD are pretty specific, but the CHI/Long Interval format is more flexible and variable. The key is spending time at speeds a little slower than your PST 1.5-mile pace while covering more than 1.5 miles total distance. The optimal paces, interval lengths, and total distances covered are hard to prescribe exactly. It's a bit of a grey area, and a number of different formats will provide benefit. As with all things related to your physical preparation, it is a good idea to start conservatively and build the volume for this category of workout slowly. Looking at the CHI table in the 26-week schedule of the PTG, you might start with a single hard 15 minute run, or a single 2-mile run. As your fitness improves, you will increase the single time/distance until you eventually split one interval into two. If you become very fit and stick with the program beyond 26 weeks (it is important to remember the structure of the PTG can be followed indefinitely, not just for 26 weeks), you may eventually perform three or four intervals. I suggest the maximum total time for the CHI/Long Interval format be about 40 minutes (such as 2 x 20' or 3 x 13'), or the maximum distance be 4-4.5 miles. The number of intervals should be from one to four, with the shortest interval being approximately one mile (in the 6-7 minute ballpark), and the longest interval being 5K (around 20 minutes, give or take a couple minutes). Every interval in a single workout doesn't have to be the same length, so for variety you could try something like 2 miles/1.5 mile/1 mile or 17'/13'/9'. Be creative, try different things, have fun, and stay within the general parameters. Use at least one format (such as mile repeats) on a regular basis so you can compare apples to apples as you chart your progress.

Before performing a CHI/Long Interval workout, be sure to warm up thoroughly. I've discussed that at length before, so I'll only remind you that warm-up for interval training needs to be longer and harder than most people tend to do. The recovery between intervals, if running more than one interval, should be adequate to maintain intensity for the next interval. As always, include some active recovery (easy jogging); don't just collapse in a heap on the ground. The actual amount of time can vary depending on how far/fast you run, but in general if you are doing mile repeats, recover for the same amount of time it took you to run (1:1 recovery-work ratio). For longer intervals, that same recovery period will probably be adequate and the recovery-work ratio will be a little smaller, but if you need a little extra time, take it. Again, the critical point is to keep up the quality of work intervals, not obsess about the amount of recovery.

Finally, but most importantly, let's consider what is the right pace or intensity for CHI/Long Interval workouts. The PTG says, "These sessions typically involve moving for 15-20 minutes without stopping at a pace approximately 90-95% of the maximal pace you could hold for that duration. The workout should be very demanding but not totally exhausting. On a scale of 1-10, the workout should feel like 8-9." In answer to a question on the Forum, I once wrote "Not an all-out sprint, because you couldn't hold that pace for even one minute, let alone twenty. It's a hard session, but not absolutely all-out. If it's your first time, it's okay to be a little conservative and maybe only go at 80-85% of what you think your max would be for 15-20 minutes. After you try it, you'll have a better idea. Then next time go a little harder, until you find the pace you know is almost but not quite your max. I like to say that after a CHI-type workout, you know that if somebody had put a gun to your head you could've gone a little faster, but that's how much extra motivation you would have needed." In terms of actual pace in reference to your 1.5-mile run time, a ballpark figure would be to start out doing mile repeats about 30 seconds slower per mile than your 1.5-mile pace. For example, if your 1.5-mile time is 9:00, do mile repeats around 6:30 per mile. I emphasize that is just a ballpark figure. Follow the KISS principle (Keep It Simple, Stupid): go pretty hard, but not absolutely all-out.

Running is Important

Hey! Running is Important!

This is the first new post to this thread in over three years. Since run performance is by far the single most important variable that predicts success in BUD/S (and also in BTC, though not quite as clearly) it may seem strange that I would not leave more comments here. But the fact is, every time I see a question on the Forum or try to think of some aspect I haven't addressed, I check and see it has already been covered in detail in this thread. In short, there doesn't seem to be anything else to say about how to improve running performance before starting your NSW selection process. Still, perhaps it is time to emphasize again just how important running is and try to give some new perspective on optimizing training.

For reasons not really clear to me, users of this Forum show less interest in training to improve running than other topics, such as strength training. The "Strength Training: Start Here" thread has twice as many views as this one, and I wish the opposite were true. Strength is important and candidates for NSW should review the material in that thread thoroughly. But in terms of time and effort, more training resources should be spent developing endurance (which includes swimming as well as running, and perhaps cross training with other cardio activities as well). Running performance is the best predictor of success, but there is more to success than simply running a certain distance in a specific time (such as a competitive 1.5-mile time for the PST, or being able to meet the 4-mile run standards throughout the phases of BUD/S). It is important to be able to recover quickly and completely between several high-intensity evolutions during the week. Those who are faster on timed runs tend to have a more developed capacity to recover. Research from various military selection/training programs shows that performance on timed runs is the best predictor of injury (slower runners get injured more frequently during the program). In the athletic arena, for sports like soccer, there is a correlation between aerobic fitness and injury. It makes sense - when people get fatigued, technique tends to break down and they are more likely to make mistakes that result in injury. People with more endurance are more resistant to fatigue and less likely to make injury-prone technical mistakes, whether it is during a soccer match or a standardized military training program.

You should be able to summarize in a few words the essential components of an effective running program. They are: a weekly high-intensity interval workout; a weekly threshold workout; and 1-2 long steady workouts per week. It's that simple. Review the NSW Physical Training Guide and the posts in this thread for definitions and details.

I do have a few comments or clarifications regarding some aspects of the PTG (which was created over eight years ago), and some answers to questions that have been frequently asked. But nothing is significantly different from what has been said before. Terminology continues to be a bit of a tricky issue creating some confusion. I try to use terms that are clearly defined and fairly simple to understand, but still consistent with popular terms users are likely to encounter from other sources (books or magazines, the Internet, other athletes or coaches). That is hard to do. The PTG describes workouts using the INT (interval) format. I generally now refer to these as Short Intervals. This is to create a distinction from Long Intervals, which I have previously referred to as CHI workouts. Other terms that are similar in meaning, but still somewhat variable depending on who uses them, include anaerobic threshold, lactate threshold, tempo training, and cruise intervals. I still use the term LSD to describe longer, continuous, lower-intensity workouts.

In the PTG, the 26-week program builds up to 10 x 1/4 mile repeats for the Short Interval (INT) format. That is still appropriate if you are following the program specifically to peak for a PST. However, for more general, long-term (beyond 26 weeks), sustained training, I find that 8 x 1/4 mile (or the equivalent) is more practical and effective. It provides enough work for experienced athletes, and it fits nicely into an hour block (including warm-up and cool-down). But otherwise the same general parameters apply. Do several intervals from as short as 200m up to 800m (half a mile), with a recovery period from 2 to 2.5 times as long as the work interval. Do combinations that add up to 3200m (2 miles) total. Sample formats include 8 x 400m, 4 x 800m, or a pyramid of 200m/400m/600m/800m/600m/400m/200m. Still another format is to alternate 500m and 300m intervals. Mix things up to keep training interesting and challenge your speed endurance at different distances. From time to time, use a standard format like 8 x 400m to chart your overall progress.

People have asked about the use of very short sprints (<30 seconds) in a running program. I encourage these in training but include them as part of strength workouts (see more discussion in "Strength Training: Start Here"). My prescriptions include 40-60yd sprints with COD (change of direction) and activities like the 5-10-5 pro agility drill. These are good for increasing the strength of lateral hip and ankle muscles that influence the ability to maintain good running technique, and also develop the alactic anaerobic system, so they are a benefit to running performance in general.

I've already discussed long Interval (CHI) workouts in considerable detail, so review my previous posts. It is the hardest of the training categories to clearly define and with a pretty wide range of effective formats, so if nothing else think of them as somewhere in between Short Interval and LSD regarding intensity and volume, and don't overthink it too much. For LSD, one of the keys remains varying the terrain if possible. Run on flat, hills, pavement, dirt, grass, or sand (even snow). Nothing is best, they're all good, but too much of anything is bad. To build endurance even more, but keep from overtraining and causing stress-related injuries, supplement running with non-weight bearing alternate cardio activities (cross training). For NSW candidates of course swimming should be trained specifically as well as running, but plenty of other options are available that are fun and convenient.

For candidates in high school or college, participation in a sport that emphasizes running may be beneficial. During the season your day-to-day training might not look exactly like the PTG, but if you are in a good program with a qualified coach, you will almost certainly benefit. Another option is to participate in local road or trail races, particularly 5K or 10K, but even a half marathon if you train long enough and smart enough (jumping into any race without proper preparation is asking for injury). The race experience is a good way to develop personalized strategies for nutrition and hydration, tapering, warming up, pacing, and handling the emotional ups and downs of a competitive environment.

Finally, a word about performance standards. It is no secret (I emphasize it constantly) that better performance correlates with greater success during selection. So I am often asked how fast a candidate needs to be able to run to have a good chance of success. It turns out, there is no simple answer such as "Run x:xx for the PST" or "Run xx:xx on the 4-mile at NSW Prep". Since there is a competitive element to BUD/S ("It pays to be a winner"), to have a reasonable chance of succeeding you have to be faster than the majority of your classmates. In some classes, that speed might be greater or less than other classes. That will be out of your control so don't worry about it. The best strategy in preparation is to reach the best performance you are capable of without overtraining or causing injury. Yes, that is a tough course to follow and a hard line to balance.

Combat Side Stroke

Naval Special Warfare Combat Side Stroke Guide

NSW
THE ONLY EASY DAY WAS YESTERDAY
BASIC TRAINING COMMAND

Combat Side Stroke

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PREFACE

This instruction manual was developed by the Naval Special Warfare Center, Preparatory Course and NSW Basic Training Command. It is intended to serve as a guide in fulfilling the basic requirements for teaching and testing the skills necessary for the combat side stroke, with and without fins. This manual is designed to promote instructional and testing standardization throughout the Naval Special Warfare community.

Proposed changes or revisions, and request for copies of this manual should be addressed to:

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San Diego 92155-5494

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CHAPTER 1

Combat Side Stroke (CSS)

1.1 OBJECTIVE

To ensure the correct body position while utilizing proper stroke mechanics, allowing the swimmer to successfully pass all Naval Special Warfare swim standards.

1.2 STROKE DESCRIPTION

The CSS is a long axis tactical stroke designed to be, low profile, efficient, and fast. It is used to travel long distances in open water and to quickly swim through the surf zone. The CSS is performed with or without fins, and in various configurations of tactical dress and protection. CSS is performed with a 90 degree balanced rotation. This stroke begins on the stomach then onto the side and back to the stomach. All put together it is a natural rotation, using the core to assist and create power and torque.

1.3 BODY POSITION

The swimmer is stabilized by alignment of the head, back, and hips which is referred to as stabilizing the core. Stabilizing the core is the foundation of the stroke. This is achieved by beginning the stroke in the streamline position and ending in the same position. With continued alignment, the energy output is directed to forward movement and sidewinding is minimized.

Common Body Position Mistakes	Corrections:
• "Swimming Up Hill" • Head at surface causing the hips to slant downward, increasing drag	• Maintaining a head down posture with head below the surface of the water, also known as "Swimming Down Hill" • Leaning into the stroke, or ensuring top of head is pointing in the direction of travel

Common Mistakes and Corrective Actions Associated with Poor Body Position

1.4 PULL ARM

1.4.1 The Pull and the Catch

The top arm begins and ends in the streamline position. It is a cyclical pattern. At the top of the stroke (the longest body position), the swimmer presses the palm of the hand down to begin the catch, continuing until a vertical forearm is achieved and the elbow is above the wrist. The swimmer then begins the pull sequence by following through until the hand is in line with the upper thigh and the arm is fully extended. The swimmer will be on their side until recovery of the pull arm has begun. Immediately, as the swimmer's hand comes in line with the thigh, the recovery sequence begins.

1.4.2 Streamline

Streamline is the body position with the least resistance that a human can create in the water. During the streamline the swimmer has the option of doing a flutter kick (see 1.7.2) to help keep momentum moving forward.

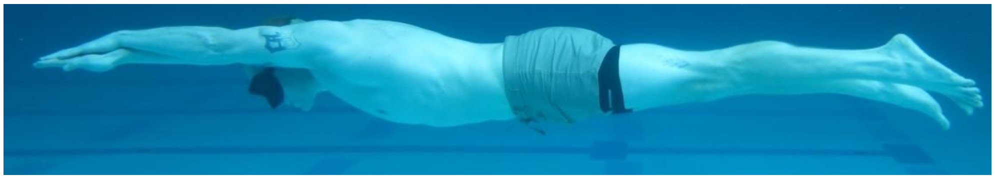

Figure 1-1, Streamline

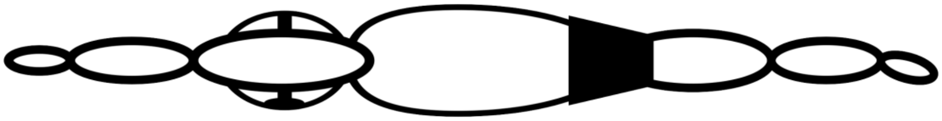

Figure 1-2, Streamline

1.4.3 Initiating the Catch

Keep the fingers lower than the wrist, wrist lower than the elbow, and the elbow lower than the shoulder. This allows the swimmer to start anchoring the elbow to maximize the effectiveness of the pull arm.

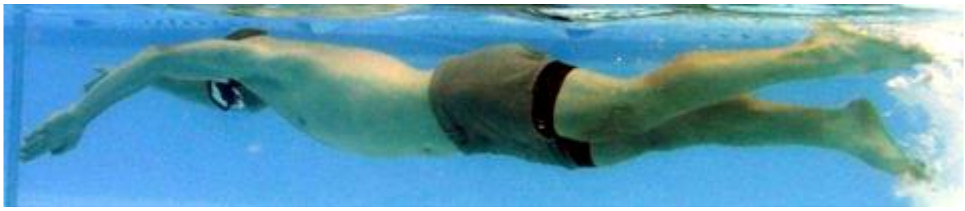

Figure 1-3, Initiating the Catch

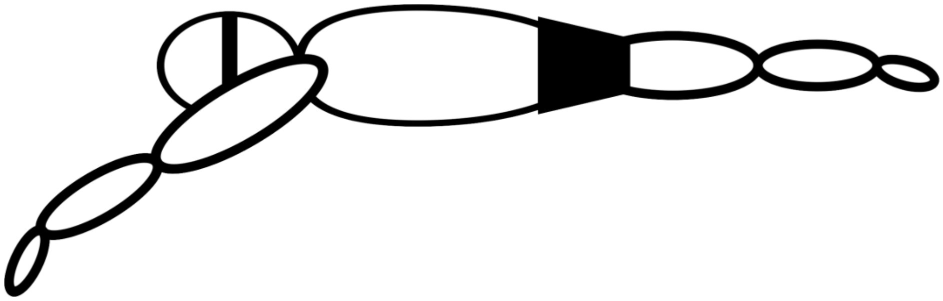

Figure 1-4, Initiating the Catch

1.4.4 Full Catch

Position the arm to allow the swimmer to pull them over an anchored position. This maximizes the surface area of the swimmers arm, while also allowing the swimmer to utilize larger muscle groups for propulsion.

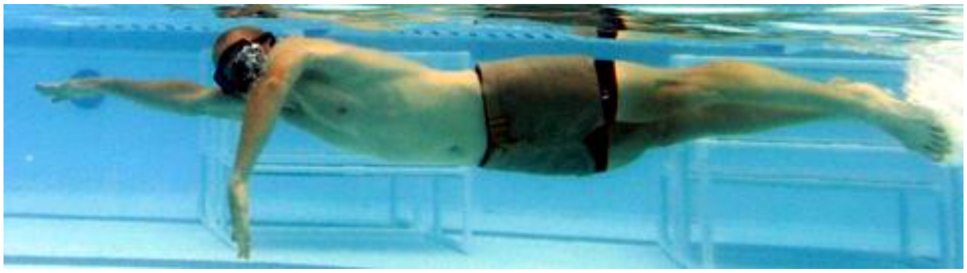

Figure 1-5, Anchored Position

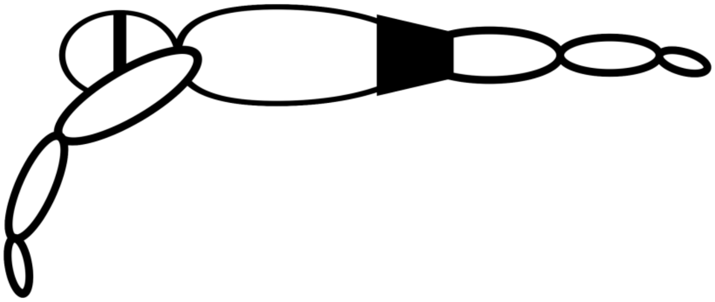

Figure 1-6, Anchored Position

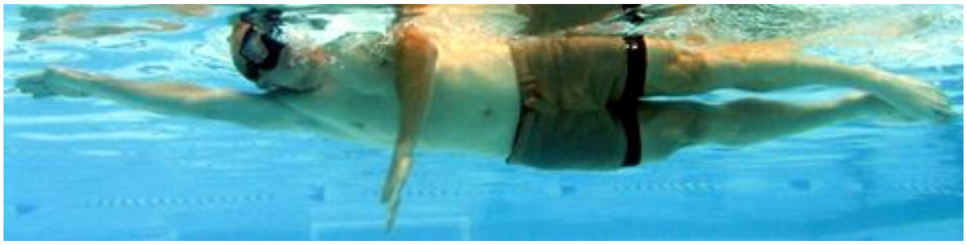

Figure 1-7, Pull Phase

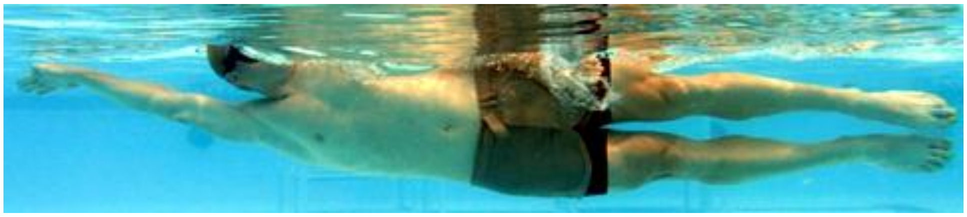

Figure 1-8, Finishing the Pull

1.5 RECOVERY

The swimmers arm will be fully extended; hand passed their waste, along the side of their body when the swimmer begins the recovery. The swimmer begins the recovery process by moving the hand forward (hand and arm must be underwater) as close to the body as possible, from passed the hips back to streamline. During this phase, the swimmer will rotate the shoulders and hips to move from their side into a streamline position and onto their stomach. The swimmer will end in the same streamline position. By rotating the body when pulling, the swimmer becomes more efficient and powerful. This creates more torque as he is pulling, as opposed to pulling with his arm only.

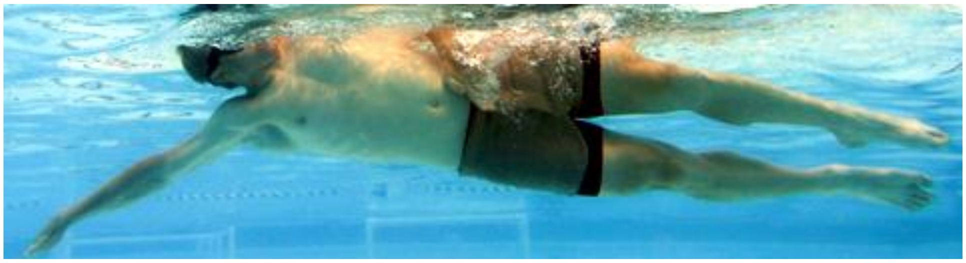

Figure 1-9, Beginning of the Recovery

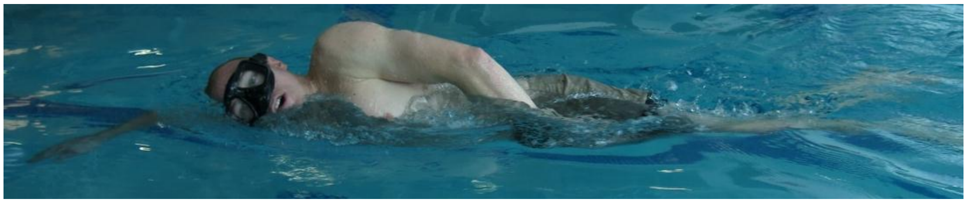

Figure 1-10, Beginning of the Recovery

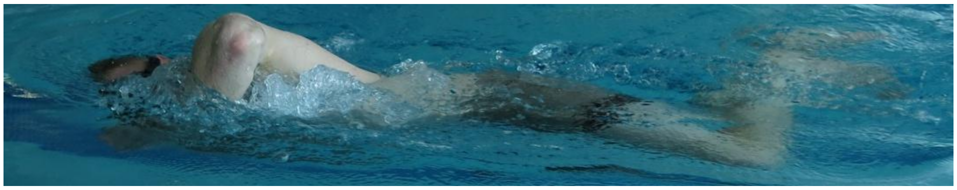

Figure 1-11, Recovery

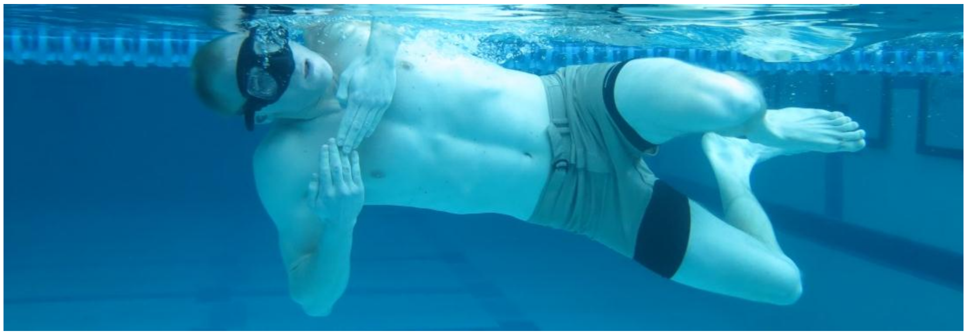

Figure 1-12, End Recovery by Entering Streamline

Common Mistakes:	Corrections:
• High or raising the elbow in recovery (Shark Fin) • Half Pull- when swimmer begins the recovery prior to full range of motion • Not achieving full extended streamline before starting next arm cycle • Not rotating when pulling • Hand exiting the water	• Following hand along the mid-line • Make sure the arm is fully extended alongside the body • Have swimmer glide underwater for 2-3 seconds in streamline position • Rotate the body and hips to create more power, similar to how a baseball player throws with more power by using his core/hips/shoulders

Common Mistake and Corrections for the Pull Phase

1.6 LEAD ARM

The lead arm works independently from the pull arm. It is a supplementary movement to complete the swimmer’s rotation to the initial starting position, the streamline. When the pull arm is recovering and has begun moving forward from the waistline to the streamline position, the lead arm slightly presses down and makes a catch. The fingertips of the lead arm will rotate down with the palm pressing back as the elbow remains higher than the hand. This leads into a small sculling motion (this motion is almost identical to a breast stroke motion. The two hands will meet at or in front of the mask as the swimmer reaches forward, placing the swimmer in the streamline position.

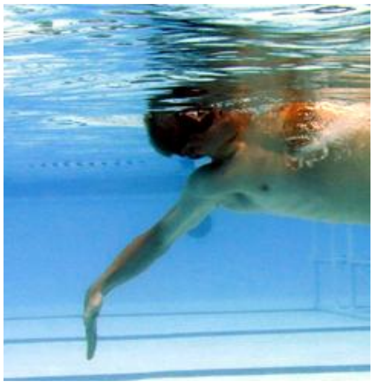

Figure 1-13, Lead arm catch

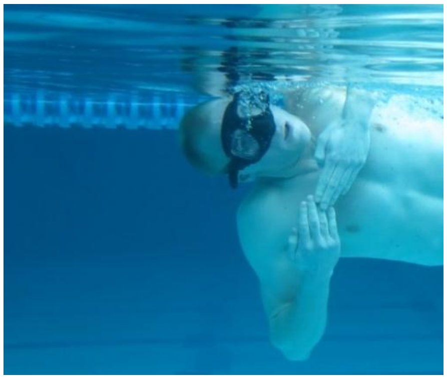

Figure 1-14, Reach Forward

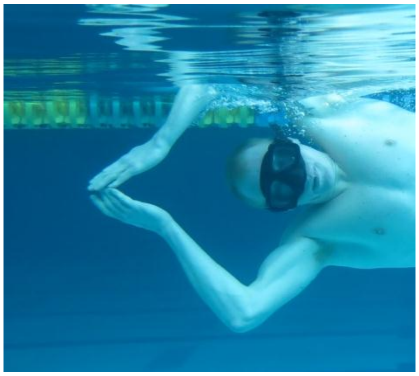

Figure 1-15, Reach to Streamline

Common Mistakes:	Corrections:
• Dropping the elbow in the initial catch position	• Keep the hand below the elbow
• Pulling the sculling arm too far back or under the body	• Keep the hand in front of the arm pit

Common Mistakes and Corrections for the Scull Arm

1.7 KICK

1.7.1 Scissor Kick

The swimmer utilizes the scissor kick in the Combat Side Stroke when not using fins. It may also be used in treading evolutions without fins. The Scissor kick is a very powerful kick, but has a resting period when in the streamline position. To become more efficient, the swimmer can use a flutter kick until the next stroke cycle begins. The legs work independently of each other. The top leg (the leg closer to the surface of the water) and the bottom leg (the leg furthest from the surface) move forward and backward respectively, and then meet back together in a streamlined position. Hence, the name of the kick, the movement resembles a pair of scissors.

1.7.1.1 The Top Leg

The swimmer draws the knee up so there is a 90 degree angle at the hip and knee. The swimmer then extends the lower portion of the leg (from the knee to foot) forward, keeping the foot flexed toward the shin. Once the top leg is fully extended, the swimmer points the toes and squeezes the leg to initiate movement back to the starting position.

1.7.1.2 The Bottom Leg

The swimmer bends the knee and kicks it backward with a flexed foot. The swimmer will then draw the foot back to the starting position meeting the top leg.

1.7.1.3 Application of the Scissor Kick

The Scissor kick is a powerful kick that also provides a moment of recovery in the glide phase of the stroke. The power of the scissor kick is derived from pushing the water behind the swimmer using the top of the bottom foot and the bottom of the top foot. At the end of each kick cycle, the swimmer will glide in a streamlined position, using the flutter kick until the next stroke cycle begins.

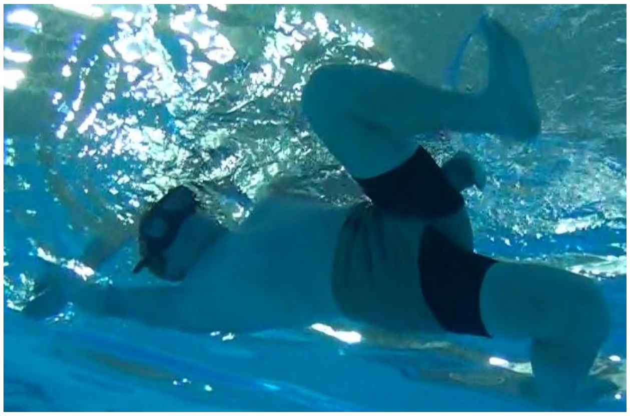

Figure 1-16, Knee Drawn Up

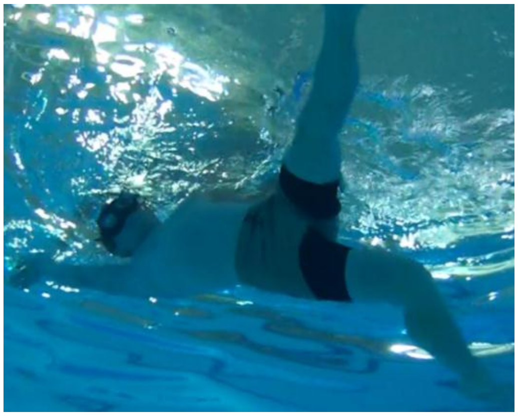

Figure 1-17, Kick the Legs outward

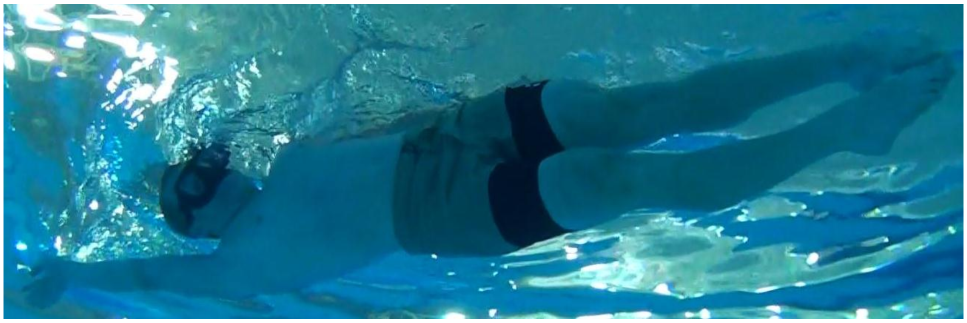

Figure 1-18, Feet Return to Start Position

Common Mistakes:	Corrections:
Top leg: pointing the foot, instead of keeping it flexed toward the shin.	Draw the toes toward the shin throughout the kick until the streamline position
Bottom leg dropping causing a breaststroke kick	Make sure both legs are moving along the same plane (forward and back)

Common Mistakes and Corrections for Scissor Kick

1.7.2 Flutter Kick

The flutter kick is used to propel a swimmer through the water. It is a continuous kick, resulting in a continuous forward motion. The kick is employed with or without fins. It is an integral part of CSS with fins, contributing to continuous speed and consistent power. The flutter kick is initiated from the hips, allowing the legs to move independently in an up and down motion. While the legs remain long and straight, this does not mean they are rigid. The swimmer must have a natural bend to the knee (a slight bend, nothing more) and relaxed ankle, though the toes must be pointed behind the swimmer. This provides as much surface area as possible to the kick, resulting in a greater displacement of water and forward motion. The swimmer will kick their legs in an up and down motion; pushing the top of the foot down, and pulling the other foot up. Without fins, the kick has a smaller range of motion and is much faster. The kick without the use of fins should occur around fifteen times every ten seconds. When fins are utilized, the rate of the kick will slow slightly, and the range of the kick will become slightly bigger. It is imperative that the swimmer does not disturb his natural body alignment with the gait of the kick.

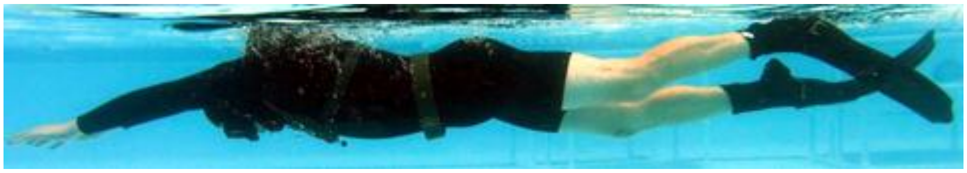

Figure 1-19, Flutter Kick with Wetsuit and Fins

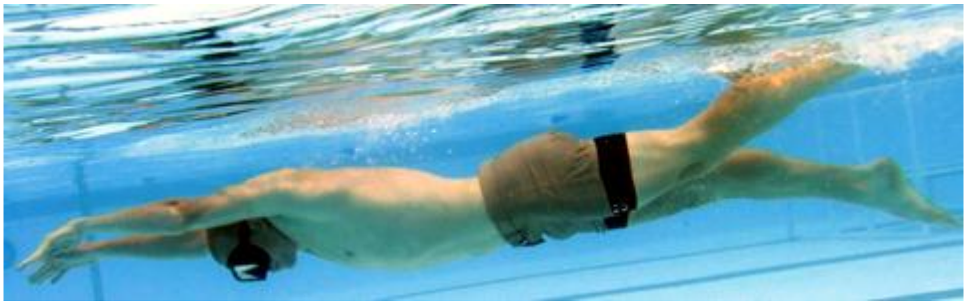

Figure 1-20, Flutter Kick Barefoot

Common Mistakes:	Corrections:
Kicking with foot in a natural flat footed position.	This limits the surface area for the kick, which in some cases leads the swimmer to sink. Have the swimmer point his toes as if punting a football.
Too Large of a Kick	The swimmer should imagine kicking within a 1.5 foot by 1.5 foot box.
Feet out of the water, excessive splashing.	Only allow the bottom of the foot to meet the surface of the water.
Bicycle Kick	This occurs when the kick is initiated from the knee. Reinforce that the kick begins with hip and there is only a slight natural bend to the knee.

Common Mistakes and Corrections for Flutter Kick

1.8 STROKE ELEMENTS COMBINED

The swimmer's starting and stopping point of the stroke cycle is in the streamlined position. The stroke begins with the pull arm. As the swimmer pulls, the swimmer will allow the shoulder and hips to open to the appropriate direction, allowing an opportunity to breath. When the pull arm begins the recovery, the kick (either scissor or flutter kick), will help facilitate the body's rotation back into the streamline position. While in this streamline position just under the surface of the water, the swimmer is encouraged to exhale slowly, and flutter kick, especially with the use of fins. This will assist in a continuous and consistent forward motion.

Slick:

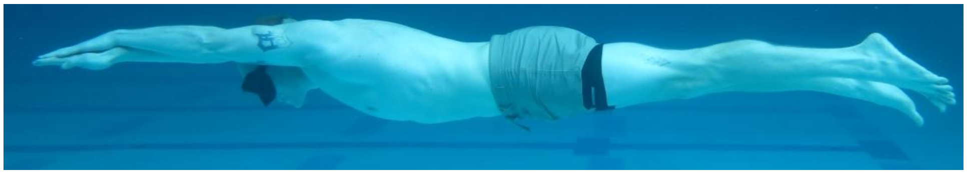

Figure 1-21, Streamline Position (Also Starting Position)

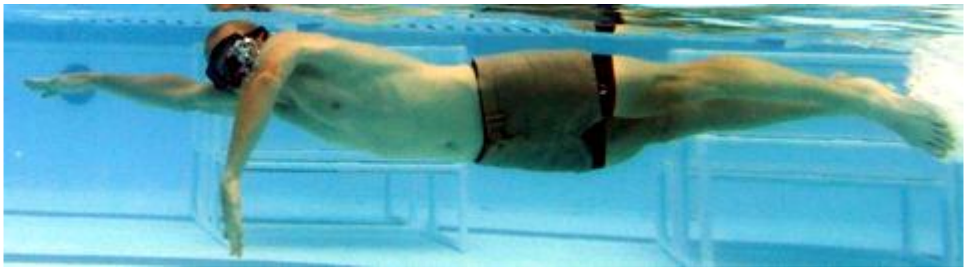

Figure 1-22, Anchor of the Pull Arm

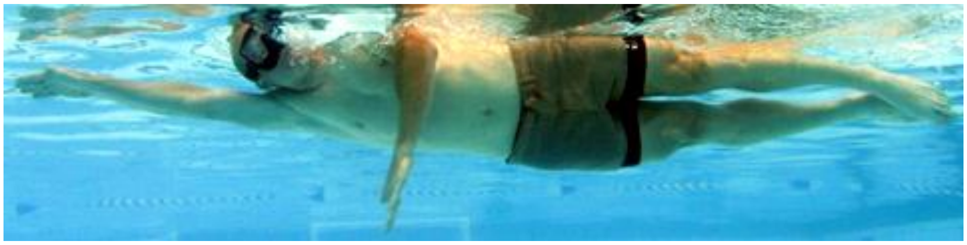

Figure 1-23, Pull Phase

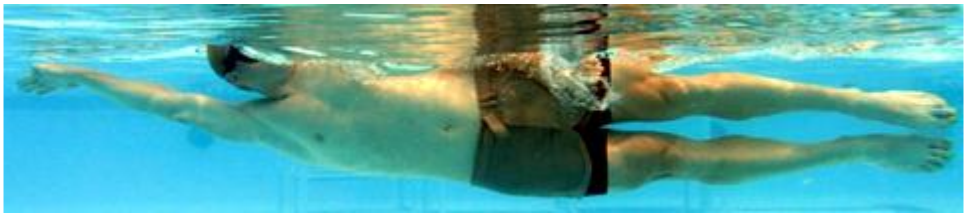

Figure 1-24, End of the Pull Phase and Begin to Breathe

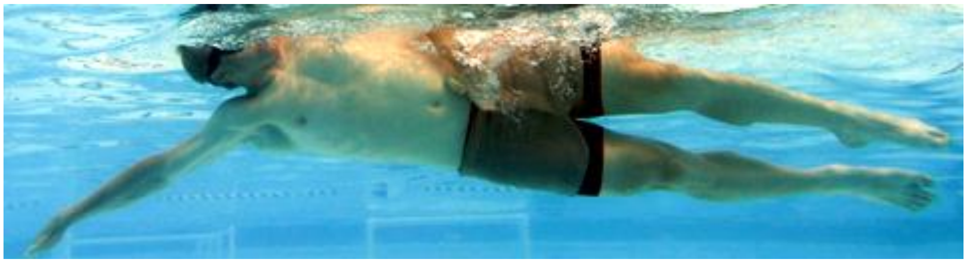

Figure 1-25, Initiation of the Recovery

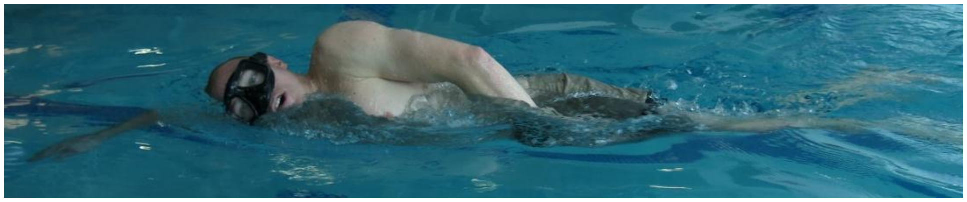

Figure 1-26, Initiation of Recovery

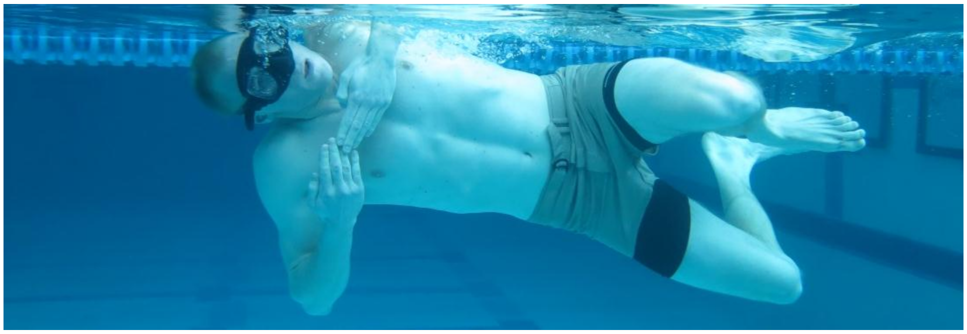

Figure 1-27, Finishing the Recovery and Starting the Scissor Kick

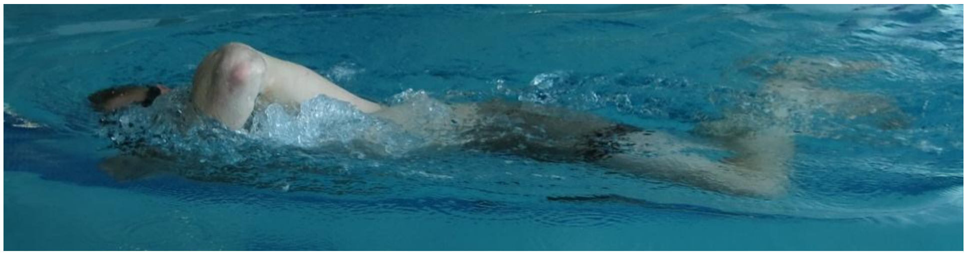

Figure 1-28, Finish the Recovery and Starting the Scissor Kick

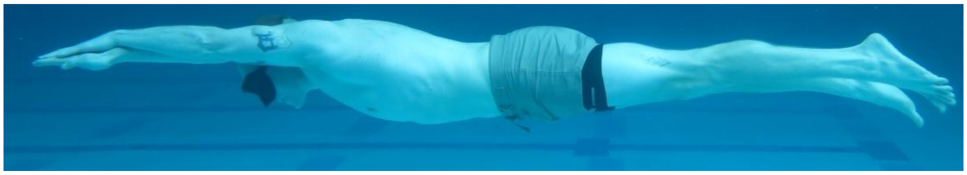

Figure 1-29, Streamline (Also the End Position)

With Wetsuit and Fins:

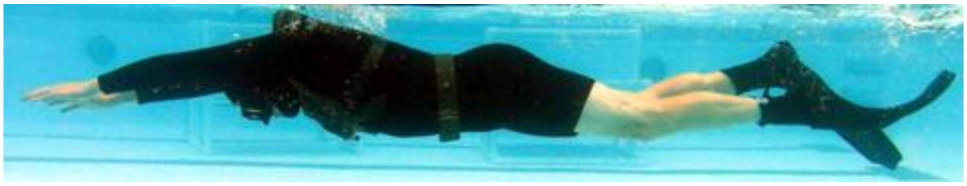

Figure 1-30, Streamline

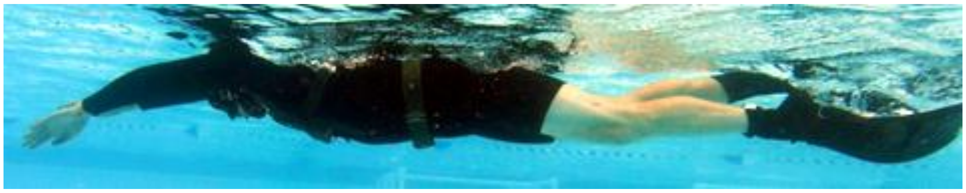

Figure 1-31, Initiating the Catch

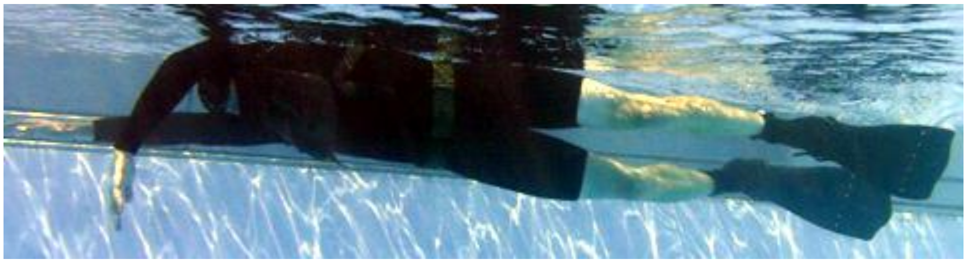

Figure 1-32, Anchored Position

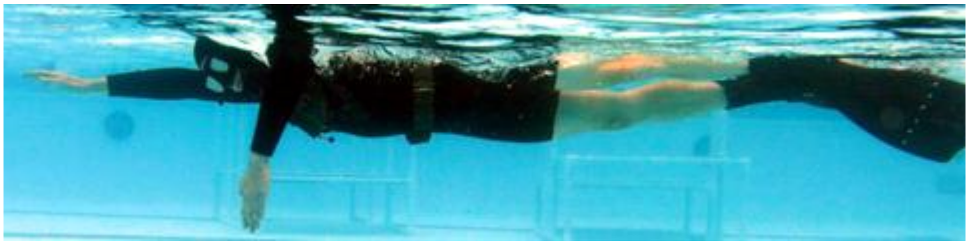

Figure 1-33, Pull Phase

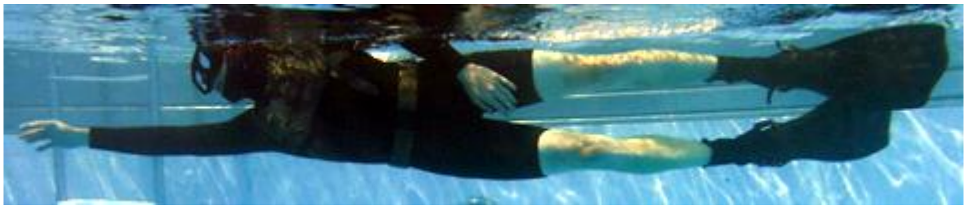

Figure 1-34, Finishing the Pull

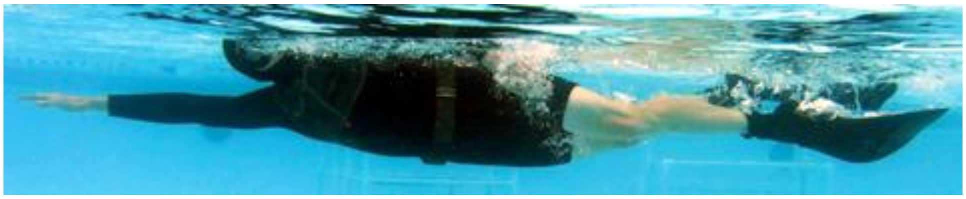

Figure 1-35 , Beginning of Recovery

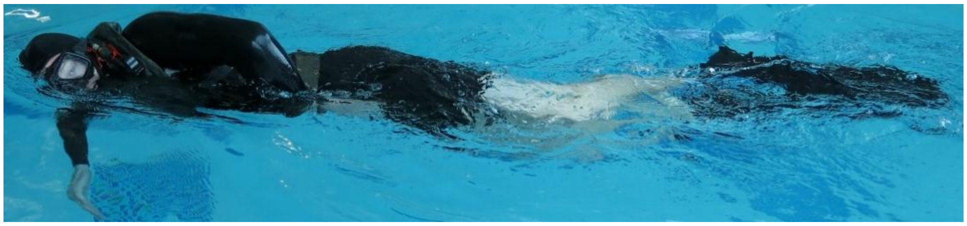

Figure 1-36, Beginning of Recovery

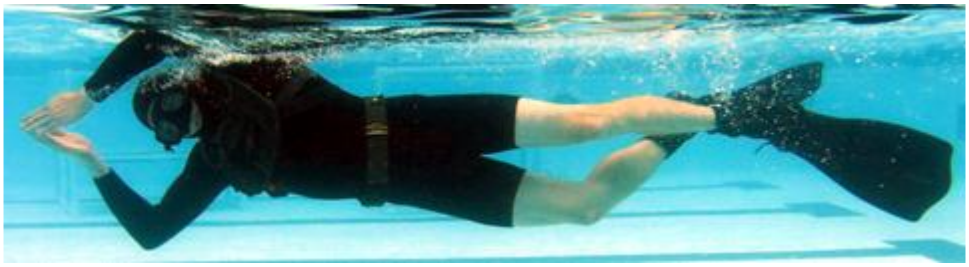

Figure 1-38, End Recovery by Entering Streamline

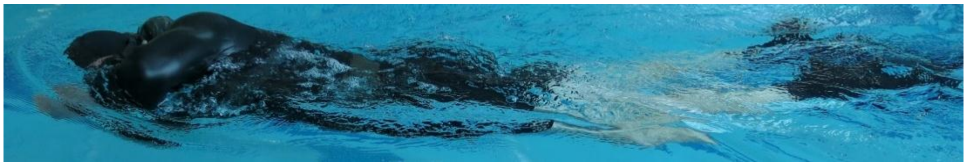

Figure1-39 , End Recovery by Entering Streamline

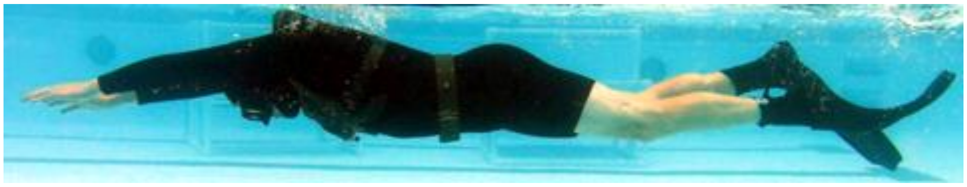

Figure 1-40, Streamline

CHAPTER 2

GUIDESTROKE

2.1 OBJECTIVE

To ensure the correct and most efficient mechanics and techniques can be used for guiding in open water swimming.

2.2 STROKE DESCRIPTION

The Guidestroke is used in conjunction with CSS during open water swimming to sight stationary objects to ensuring the swimmer swims in a straight line. The Guidestroke itself is very similar to a breaststroke stroke in that the swimmer is lifting the head and upper body out of the water. While the head is out of the water the swimmer will then sight on a stationary object, whether it is a buoy in the water or a house on land, this will help the swimmer stay on course.

2.3 BODY POSITION

See Paragraph 1.3

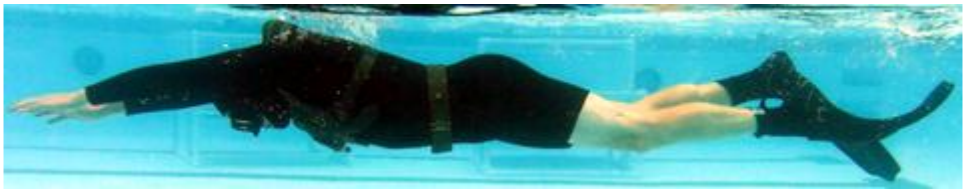

Figure 2-1, Streamline/Starting Position- Underwater Lateral View

2.4 BREASTSTROKE PULL

From a streamline position, palms press out slightly wider than the shoulders. Continuously press the palms against the water. Rotate the hands so that the palms pull in towards the chest, finger tips pointing down while maintaining a high elbow position. Pulling the arms towards the chest creates forward momentum which allows the chest to be angled up, and the head in place to breathe and guide.

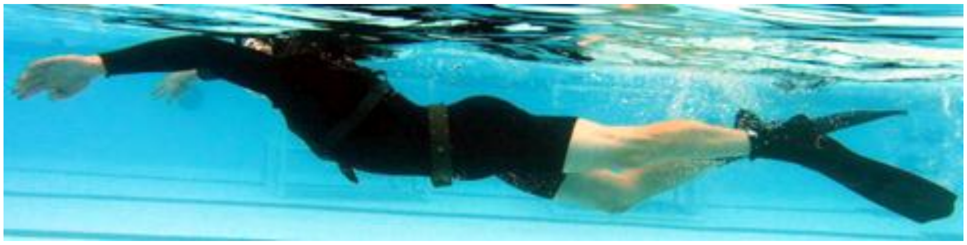

Figure 2-2, Initial Catch for Breaststroke Pull- Underwater Lateral View

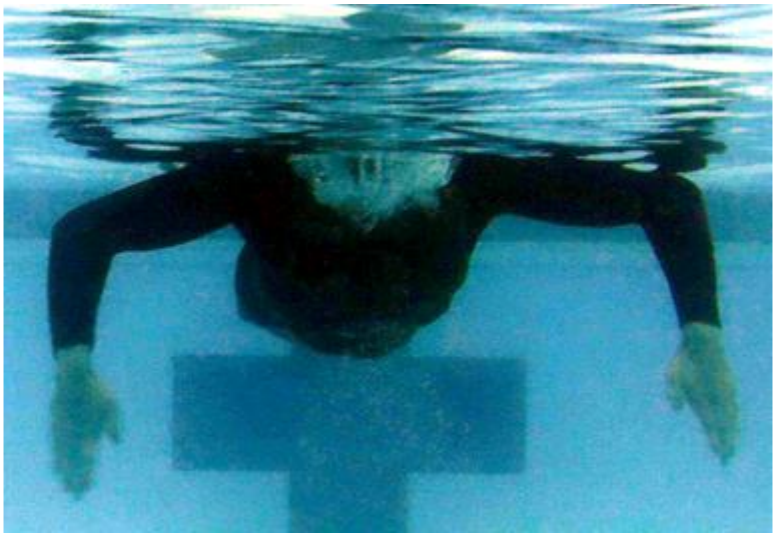

Figure 2-3, Initial Breath and Pull for Breaststroke

2.5 GUIDING

Guiding is used to sight stationary objects and ensure traveling in a straight line during open water swimming.

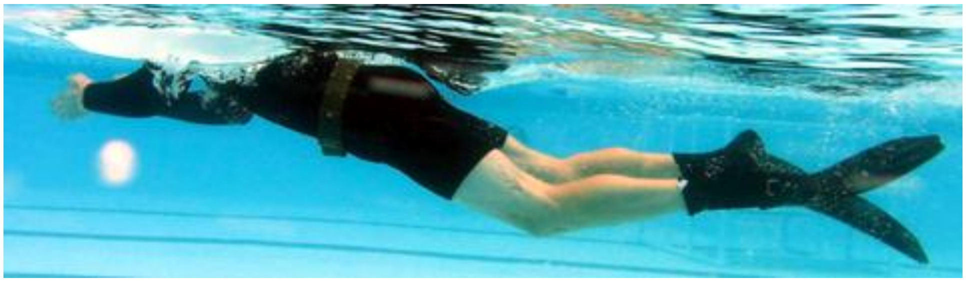

Figure 2-4, Breathing and Guiding Position- Underwater Lateral View of Guiding

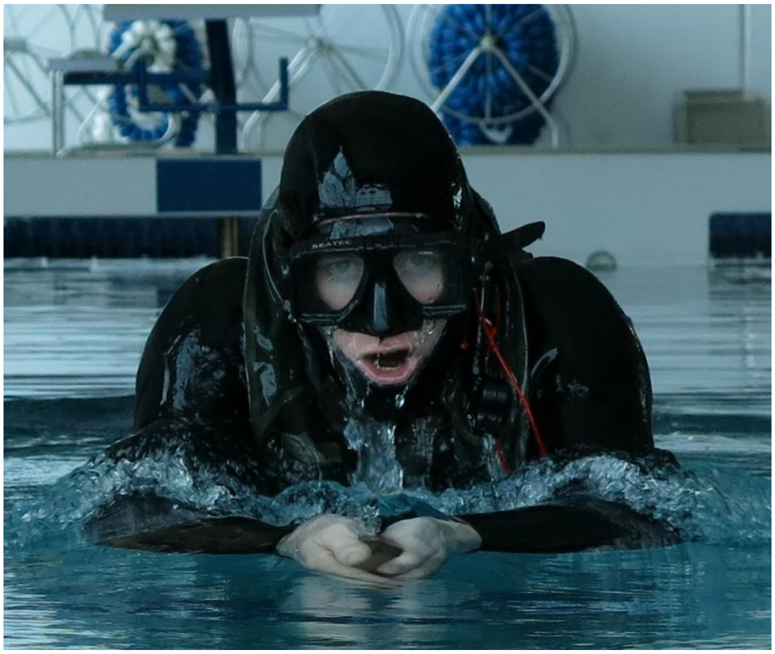

Figure 2-5, Breathing and Guiding Position- Front View of Guiding

2.6 DOLPHIN KICK

The kick used with the Guidestroke is a Dolphin Kick. As the arms move forward, both feet are used simultaneously to kick in a downward motion and drive the body below the surface of the water into the initial starting or streamline position.

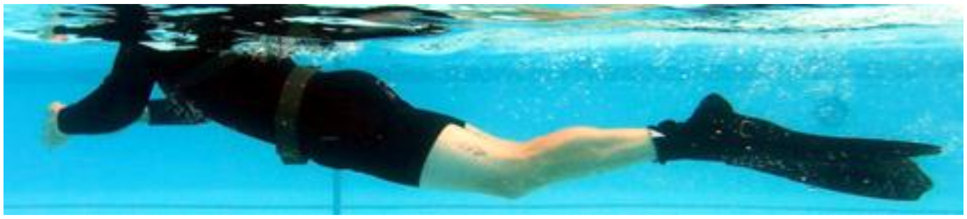

Figure 2-6, Initial Kick Phase- Underwater Lateral View of Dolphin Kick

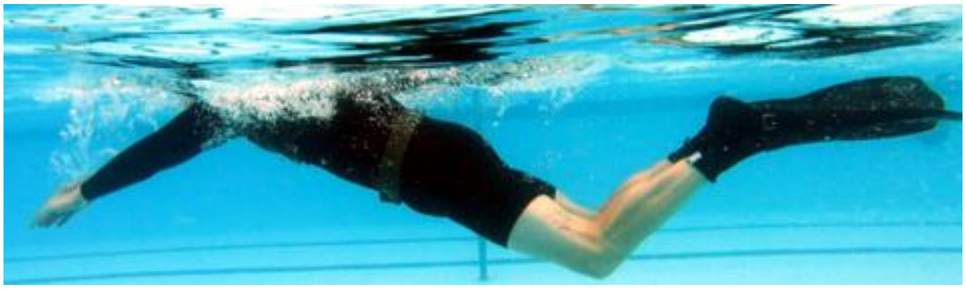

Figure 2-7, Power Kick Phase- Underwater Lateral View of Dolphin Kick

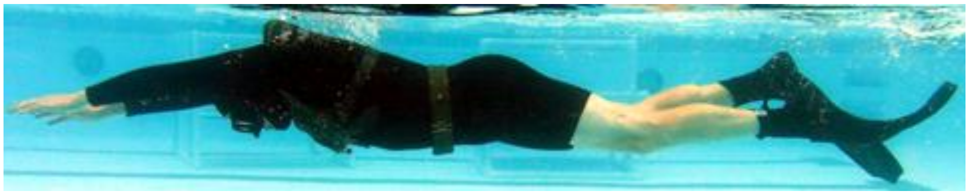

Figure 2-8, Ending Position into Streamline- Underwater Lateral View of Dolphin Kick

NOTICE:

DO NOT USE A HIGH ELBOW RECOVERY (SHARKFIN)

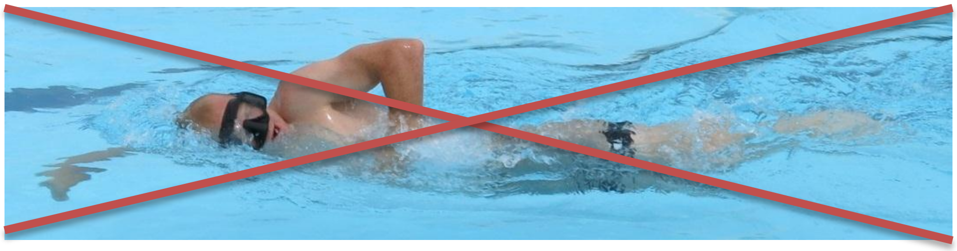

Figure 2-9, “Sharkfin”

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1. Navy Swimming and Water Survival Instructor’s Manual NETC P1552/16 (07-07)
2. Swimming Fastest ISBN-13: 978-0-7360-3180-6

GLOSSARY OF TERMS

Balance: The ability to maintain horizontal body position in the water

Catch: The start of an arm stroke when a swimmer begins to grip and move their hand through the water as though swimming over a barrel

Combat Side Stroke: A stroke used by Naval Special Warfare which combines side stroke and freestyle swim strokes

Dolphin Kick: A kick in which both feet and legs move in unison. The power is generated by the body NOT the knees

Drag: The amount of friction created by a swimmer in the water

Flutter Kick: An alternating whipping motion of the legs used in various swimming styles (combat side stroke and freestyle)

Guidestroke: A technique used to sight stationary objects and ensure swimming in a straight line during open water swimming.

Long axis stroke: A stroke in which the body rotates around the axis that runs along the swimmers spine from the head to the tailbone (combat side stroke and freestyle)

Neutral Body Position: The most natural position for a swimmers body in which the head, neck, and spine are all aligned

Open Water Swimming: Any swimming that takes place in a large body of water other than a swimming pool i.e. lake, pond, ocean and bay

Rotation: The transitional movement of a swimmer’s shoulders and hips from the horizontal plane to the vertical plane and back to the horizontal plane while keeping head to toe body alignment with the surface of the water

Scissor Kick: A kick used in combat side stroke and rescue swimming, in which the top leg is pulled up toward the chest till a 90 degree angle is achieved with the knee, the bottom leg moves backward in the same pattern as done when kicking a ball. Both legs are released and brought together at the same time propelling the swimmer forward

Scull: A small sweeping pull using the hand and forearm that moves similar to a figure-8 pattern, continually pressing against the water to create propulsion or in the case of treading: lift

“Shark Fin” or “Shark Finning”: As it pertains to the NSW Combat Side Stroke is an unauthorized arm recovery stroke. The hand and arm is recovered in such a way as to promote the elbow exiting the water at an extreme angle resulting in the arm resembling a “sharks fin”. It is not authorized for use on testing or conditioning swims at any phase in training. This technique is discouraged due to the tactical application of the stroke, it is considered overt

Sighting: The process of orienting one’s direction in open water swimming off of a stationary object

Streamline: Body position that creates the least amount of drag, visualize a torpedo

Stroke Cycle: One complete arm and leg action in any stroke

Swim Time Standards: Entrance 500 yard swim, SEAL- 12:30, SWCC- 13:00. Exit 1000 meter swim with fins, SEAL- 20:00, SWCC- 22:30

Swimming Down Hill: An analogy used to define the feel the swimmer has when in the proper body position (Defined in paragraph 1.3)

Swimming Up Hill: An analogy used to define the feel the swimmer has when they are in incorrect body position i.e. head up and hips down

Strength Training

Naval Special Warfare Strength Training

By Mike Caviston, Director of Fitness, NSWCEN

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Editor's Note

This content was originally posted by Mike Caviston in an online form. All I have done is format his material into a printable document. Any edits I have made are for readability, but none of the content has been changed.

Source:
https://www.sealswcc.com/forums/forum/fitness/strength-training/149-strength-training-start-here

Strength Training: Start Here

Over the past couple of years, I have posted a lot of material on training and nutrition and answered a lot of specific questions, which has been lost to public view as the SEALSWCC.com forum has been upgraded. I will use this thread to re-post previous items related to common topics and FAQs. I will also try to consolidate other information sources and links to other materials on the Web I think are relevant to SEAL or SWCC candidates. Anyone participating on this forum should begin by thoroughly reading the **NSW Physical Training Guide** (PTG). While I provide information as Director of Fitness for the Naval Special Warfare Center, I welcome feedback and other points of view. This thread will remain locked, but feel free to post comments or questions in other threads.

Strength Training Guidelines

Questions about strength training are the most frequently asked on SEALSWCC.com. Here are several short essays on topics related to strength.

General

When it comes to endurance training, my recommendations are pretty specific (one high-intensity short interval session, one long interval session, and multiple LSD sessions per week for running and swimming), and I encourage candidates to follow those recommendations pretty closely. When it comes to strength training, there are many approaches to training and many programs you might follow, with different methods used and various exercises selected, but each approach capable of adequately preparing you for BUD/S. There are also programs I would discourage you from following because they are ineffective or unsafe. The specific strength training guidelines I am providing here are appropriate for candidates starting preparation with a low level of fitness, and for people with little weightlifting experience. (The guidelines are also appropriate and effective for experienced lifters beginning with a high level of fitness.) The guidelines are designed to provide good results with limited risks (we want training to prevent more injuries than it causes). The strength recommendations are also intended to be time-efficient, keeping your schedule more open to develop your running and swimming abilities.

Definition of Strength

"Strength" refers to the ability to produce force in a single all-out effort. High levels of strength allow you to lift or move heavy objects or to control the movements of opponents or aggressors. Strength is determined by such variables as muscle fiber type, architecture and size (bigger muscles tend to produce more force), as well as neural stimulation (activating more fibers during a contraction results in greater force production). While maximal strength is limited by genetic factors, it can be increased significantly if the right training stimuli are applied.

Benefits of Strength

For a BUD/S student, strength has many benefits. Early in the program, you and your classmates will spend a lot of time carrying 200-lb logs and 300-lb boats. Later, you will carry weapons, ammo and gear everywhere you go. The stronger you are, the less physical and mental stress these training evolutions will cause. Developing strong muscles will also develop strong bones and connective tissues, making you more resistant to injuries - a very desirable quality for a BUD/S student. I strongly encourage BUD/S candidates to structure strength training towards goals of injury prevention as well as goals of performance. Success at BUD/S requires a body that can take the ongoing pounding of daily training evolutions as well as occasionally move heavy things.

Muscular Strength and Muscular Endurance

These two qualities complement each other. Increasing your absolute strength using such exercises as chest press and lat pull-downs will make it easier for you to move your body weight multiple times when doing push-ups or pull-ups. Increasing your general muscular endurance with multiple sets and repetitions of a variety of calisthenics exercises (push-ups, pull-ups, sit-ups, dips, lunges, flutter kicks, etc.) will enhance your strength training. While muscular strength and endurance are related and overlap each other to some extent, they are not the same and so training time should be devoted to each. To some extent, strength and muscular endurance routines could be performed on the same day, but for best results it is probably a good idea to do most of your calisthenics work on days when you are not performing heavy resistance training. [Think of the balance between muscular strength and endurance as being a little like a good running program - some days are LSD, and some days are high-intensity Intervals.]

Core Strength

Core strength is required for both optimal performance and to make the body more resistant to injury. The muscles that surround and support the spine and help transmit forces between the upper and lower extremities need both strength and endurance. There are several specialized "core" exercises (such as plank, side plank, bridge, and bird dog) that should be incorporated into training. Additionally, a proper weight lifting/resistance training program will enhance sore strength. [See more discussion below in the area titled "CORE STRENGTH".]

Training Stimulus

We want our strength program to generate the optimal training stimulus (a signal that tells the muscles to get stronger, and if desired, to get bigger). Many people assume a hormonal response is the most important signal, but in fact hormones may only amplify the response to training, not cause changes to occur. The actual signal to the muscle results from changes that occur at the molecular level due to mechanical stress within the muscle fibers during forceful contractions. An effective program will include some exercises that isolate muscles very specifically (allowing the most forceful contractions per unit of muscle), as well as some whole-body exercises that utilize many muscles simultaneously (causing a greater release of anabolic hormones such as growth hormone and testosterone). Optimal stimulation occurs when movements are performed slowly enough to allow fibers to generate high levels of tension, and movements are performed through a full Range of Motion (ROM) to affect the molecular components of the entire fiber. Negative or eccentric contractions are particularly effective for developing intramuscular tension and stimulating strength adaptations.

Weekly Training Sessions

You should include resistance training for various muscle groups 2-3 times per week. The Physical Training Guide splits the workload into upper and lower body routines. The idea is to integrate and balance weight lifting with run and swim training as well as calisthenics and core exercises, so that the legs or arms aren't overworked on a given day. If you construct a training schedule that differs from the PTG, make sure to distribute the workload sensibly. You may work the whole body (upper, trunk, lower) during a single session, but take care not to overdo it. If a workout becomes too long with too many exercises you risk leaving the muscles too fatigued to perform well during endurance or calisthenics training. Intensity will drop off, leaving the workout less effective regarding strength development. A general rule of thumb is to limit each strength session to an hour or less (there may be exceptions, but if your program is organized properly it doesn't take a lot of time to train effectively).

Integrating Strength & Endurance Training

For best effect (especially during the early weeks of training), split strength and endurance training into separate sessions, morning and afternoon, to allow more recovery and better performance. If this is not practical, then perform strength and endurance workouts back-to-back (the more your fitness improves, the less of s detriment this will be). Which activity you do first is pretty much up to you, since there are advantages and disadvantages to beginning with either strength or endurance training. A general tip is to work on your weakest area first, while you are fresh. If you have good strength and poor endurance, run or swim before you hit the weights. If you have good endurance but are relatively weak, begin with the weights.

Circuit Training

It is a current trend in fitness to blend strength and endurance components during training, by alternating weight stations with cardio stations (exercise bike, treadmill, rowing machine). This can be a fun and challenging format, and can provide some strength and endurance adaptations in a limited amount of time. However, it is not the optimal format for best overall performance. By mixing the strength and endurance stimuli, both are diluted; you aren't able to lift as much weight or run as fast as if you focused on strength or endurance separately. This is not to say you should never do circuit training;

used properly and sparingly, circuits can provide a new challenge and add some variety to your routine. But most of the time, I encourage you to keep your strength and endurance sessions separate. Some argue that "real life" doesn't always make a distinction between the need for strength or endurance and training shouldn't make that distinction either. But the essence of training is that we isolate key components and maximize their improvement so that when we get in "the game" we can combine those individual components more effectively to do whatever is demanded of us. Another concern regarding circuit training is the attempt to use strength-appropriate exercises (presses, deadlifts, squats, etc.) to develop cardiovascular fitness using lighter weights and high reps at fast speeds. This is not a very effective way to develop cardiovascular fitness (even if heart rate is high), and fatigue or poor technique may contribute to injury.

Equipment

Your muscles don't really care what equipment you use while strength training, as long as it provides significant resistance to be overcome during a variety of movements. Many athletes strength train using free weights (Olympic bars, dumbbells) or some type of machines (such as Hammer of Nautilus). Other forms of resistance that might be incorporated into training include kettlebells, weight vests, elastic bands, and manual resistance provided by a partner. I don't want to spend the time here doing a complete review of each mode. Each has their advantages and disadvantages, and an effective program will include a combination of equipment choices. Those choices will be determined partly be what is available and partly by what you prefer, but as a general rule I encourage you to mix things up and rotate regularly among different forms of resistance. Just be sure that any source of resistance allows you to move through a complete Range of Motion with good technique and control.

Exercise Selection

Your program should consist of a variety of exercises that target the upper body, the trunk/core region, and the lower body. The exercises should include movements in multiple directions and planes - up and down, front to back, side to side, and rotation. The movements should be balanced across opposing muscles or groups of muscles. A simple phrase that captures this idea is "push-pull", which means that every motion involving extension should be balanced by another using flexion (and abduction balanced with adduction, internal rotation with external rotation, etc.) Additionally, there should be balance between the right and left side - making it desirable to incorporate dumbbells or machines that work each limb independently into your repertoire.

Some examples of basic movements

- Upper body push - overhead/military press; chest/bench press (flat, incline, decline); dips, or triceps push-down.
- Upper body pull - pull-ups (body weight or with a weighted vest) or lat pull-down machine; row pull; upright row or biceps curl.
- Supplemental shoulder exercises - external/internal rotation; Ys and Ts, "full can" (with thumbs up) or "empty can" (with thumbs down); lateral raise or front raise (only bring the arms to the horizontal position, and not above).
- Trunk flexion - sit-ups or crunches; hanging leg raises (knees to elbows).
- Trunk extension - superman, back extension machine, straight-leg deadlifts, good morning.
- Trunk rotation - Russian twists, leg wipers, cable wood choppers.
- Lower body - squats (back, front, goblet) or leg press; leg extension and leg curl; lunges; hip abduction/adduction; deadlift; heel lift (calf raise); dorsiflexion (lifting the forefoot off the ground against resistance).

Exercise Variations

For a given movements pattern, use multiple variations during different training sessions. For example, for the chest press, you could use an Olympic bar, dumbbells, push-ups with a weighted vest, or various machines; you can also include incline and decline variations along with the standard horizontal position. The basic rowing motion can be accomplished by doing bent-over rows with a straight bar; dumbbells (both arms simultaneously or one arm at a time, using a bench to support the torso); and a seated row-pull machine or a multi-station cable machine. The overhead/military press movement can be accomplished with a straight bar, dumbbells, or machines. You could perform the movement standing on a firm surface or soft surface (sand or foam mat), seated with back supported or not supported; if using dumbbells, you could work both arms together or each arm separately. The rationale for mixing things up and using alternate versions of the basic movements is to increase the likelihood of strength gains being applicable to environments outside the weight room (it is possible for someone to specialize in an exercise like the bench press and become very efficient at performing that specific movement, yet lack the generalized strength necessary to manipulate heavy objects in other situations). Some exercise variations emphasize stabilization by supplementary muscles (core, shoulder girdle), and strengthening those muscles is a goal of training. But the more supplementary muscles are involved, the harder it is to maximally challenge the primary muscles (they are limited by the performance of the weaker supplementary muscles). So at one end of the spectrum, you might do an overhead dumbbell press with one arm (and even one leg) while standing on a soft mat - this will significantly challenge stabilizing muscles in the legs, trunk, and shoulder, but you will have to use a relatively small weight. At the other end of the spectrum, you can sit with the back supported, minimizing the involvement of stabilizing muscles, and use more weight to maximally challenge the delts and triceps.

Simple vs. Complex Movements

Some exercises are simple, involving a single joint and one or few muscles. Some are complex, involving multiple joints and many muscles that must be activated in a specific sequence. Both simple and complex movements have their place in training and I want to elaborate on the relative advantages and disadvantages of each.

Simple, single-joint, or "isolation" exercises have gotten a bad rap in the popular fitness media as being "non-functional", which is disappointing since these exercises can be very functional. Biceps curls and hamstring curls would fall under this category; some people would include exercises such as bench press or row pulls. Any activity or fitness component can be overdone, but these (and other) exercises have a definite place in a BUD/S candidate's preparation from both a performance and injury prevention standpoint. A complex movement can only be as strong as its weakest link, and isolating specific muscles will allow you to challenge them appropriately until their strength is in correct proportion with other muscles used in complex movements. You will also be able to target all muscle fibers throughout a complete range of motion. There is a difference between a seated overhead press and exercises like the push-press or thruster, where the legs are used to accelerate the weight past the point where the shoulders would initially be engaged. The biceps may be utilized while performing a deadlift, but only while statically contracting, and not through a range of motion.

Complex, multi-joint, or "whole-body" exercises have been portrayed as the ultimate tool for developing fitness. Power lifts or Olympic lifts may have value if performed properly, but should not be used to the total exclusion of simple or isolation exercises. These complex lifts are fairly technical, so don't attempt them without proper coaching and supervision (merely looking at a few YouTube videos is probably not enough). For inexperienced lifters, injuries are more likely to occur and the risk-to-reward ratio is fairly high. Even for experienced lifters, in my opinion it is not desirable to focus much on Olympic-style movements. While these exercises will develop strength, many people assume they will develop motor skills and movement patterns that directly transfer to other environments, but this assumption is not well supported in the training literature. The most established evidence-based relationship between Olympic lifting and sports performance is the vertical jump (not likely to be a limiting factor during any of the physical training evolutions in Bud/s). I am not aware of any analyses of athletic populations (e.g., college or professional football players; college or Olympic rowers, runners, swimmers) that show meaningful correlations between measures of strength, including Olympic lifts, and performance. If you choose to use Olympic lifts as part of your training, make sure you learn to perform them properly, and use them as part of a broader and more BUD/S-specific strength training program.

Emphasize Eccentric Movements

I've mentioned the importance of eccentric (negative) contractions in stimulating strength gains, but the emphasis bears repeating. Many people expend effort to lift a weight up, but offer minimal resistance as the weight returns to the starting position (or step away and let the weight drop to the ground). Eccentric conditioning is beneficial from the perspective of both performance and injury prevention. It is essential to remember that muscles are utilized not only to produce force (as when lifting the body or other objects) but to absorb force (as when landing, catching, setting something down, or getting hit by another object). There are countless examples of the need for eccentric strength during BUD/S - the o-course, log PT, IBS rock portage, and ruck runs all spring immediately to mind - and this strength should be specifically trained for. During BUD/S you will often be carrying extra weight (gear) while moving on a variety of uneven and unstable surfaces, and the chances of slipping, tripping, stumbling or falling are pretty high, and you will be forced to catch yourself in some awkward posture with your arms and/or legs forced to absorb a large impact in some unnatural position. SWCC students will take a pounding in small boats at high speeds in heavy seas, absorbing several times your body weight of force with every wave. Build up your tolerance for these inevitable occurrences by incorporating exercises for the upper body, trunk, and lower body in multiple directions and planes, performed through a full ROM and emphasizing the eccentric as well as the concentric phases. There are advanced techniques for maximizing the eccentric stimulus (such as forced negatives), but the general technique I recommend is simply to resist gravity to some extent when returning the weight to the starting position. So if it takes you 1-2 seconds to perform the concentric portion, it should take you 2-4 seconds to perform the eccentric portion.

Plyometrics

Plyometric, ballistic, and other explosive movements have their place in training, but should probably make up a relatively small percentage of your preparation for BUD/S. Athletes who want to maximize their performance on sprinting and jumping activities would devote more time to Plyometrics, but 40-yard dash time or vertical jump probably won't be the limiting factor for BUD/S candidates. On the other hand, Plyometrics can enhance neuromuscular coordination and proprioception in ways that should aid you in performance and injury avoidance in a variety of environments. Plyometrics include activities such as box jumps and squat jumps as well as upper body movements like clapping push-ups and medicine ball chest pass. For jumping activities, I encourage a 3-dimensional approach that utilizes not only vertical jumps, but also horizontal (standing long) jumps and lateral hops (side to side). This approach will help develop strength in the hip and ankle muscles used to provide stability when running in soft sand. For vertical jumps, my recommendation is to utilize an explosive upward movement combined with slow, controlled downward (eccentric) movements upon contact with the ground. Focus on proper landing technique (which is unfortunately lacking in many athletes, including those in the NSW community). Land softly and quietly, utilize knee flexion to absorb the impact force (many people don't bend their knees enough), and keep the knees aligned between the ankles and hips (don't let them knock together). As with other activities, add volume and intensity in a systematic, progressive manner. I encourage you to perform Plyometric or ballistic activities to the point where fatigue just begins to limit performance, but not past the point where you lose the ability to control your technique while landing.

Sets and Reps

Variables that can be manipulated while strength training includes the number of sets performed of various exercises, and the number of repetitions performed per set. My advice is to perform a wide variety of exercises limited to 1-2 sets per exercise (as opposed to 4-6 sets of only a couple exercises like bench press or squat). I also suggest performing most sets in the range of 8-12 reps, but some sets with fewer (4-6) and some with more (15-20) reps. These are general recommendations, with plenty of room for variation, as described below.

Performing a variety of exercises for the upper body, trunk, and lower body in multiple directions and planes supports whole-body strength and promotes muscle balance. To leave time and energy to do a greater assortment of exercises, generally only perform a single set of each exercise. The optimal number of sets for maximum strength gains is open to debate, but most of the gains from strength training will be realized after one set, with additional sets providing progressively diminishing benefits (if any). A single-set routine may be less than optimal if your only goal is to maximize strength in a select number of activities (bench, squat), but in the interests of well-rounded preparation for BUD/S that includes plenty of running and swimming along with calisthenics, core exercises, and stretching - it makes sense to keep your lifting routine streamlined and relatively short. To realize gains from a single set, it is necessary to maintain intensity, which is achieved by performing the set "to failure". This means you perform as many reps as possible while using good form, until muscle fatigue prevents you from completing another rep. Count the number of whole reps completed for the set. [For more information, see the section below titled WHAT DOES IT MEAN TO WORK "TO FAILURE".] If you feel you are not prepared to give a maximal effort for a particular exercise, especially near the start, you can do a submaximal warm-up set first. Do not try to perform more than one set of a given exercise to failure. If you decide on a given day to do multiple sets of a particular exercise (remember, the "one set" recommendation is a general guideline, not carved in stone) then each set will have to be submaximal. You would still work hard on each set, but not go to complete failure.

For each set, determine a number of repetitions to perform. I recommend that most sets be performed in the range of 8-12 repetitions. There is room for debate about the optimal rep scheme, but in general this provides a good combination of strength and muscular endurance. Choose a weight that you can lift (using proper form) at least eight times; lift until you can no longer complete a rep with proper form. For a beginner, it will take a little bit of trial-and-error to find the correct weight. It's no big deal if on your first attempt you can only do seven reps or end up doing 13 or 14 reps; you can make an adjustment for your next workout. Keep records of all your lifts to track your progress, set appropriate targets and determine when to increase your loads. The basic approach is to start with a weight you can barely lift eight times; stick with that weight for several workouts, trying to complete the max number of reps possible each time; and when you get to the point where you can complete twelve good reps, add a little more weight for your next workout. Keep cycling weight and reps as your strength improves; this is known as double progression. I suggest using the 8-12 rep format for about 60% of your workouts (or 3 out of every 5 days you lift). The remaining workouts would be split between doing around 6-8 reps or 15-20 reps. You would simply use a lighter or heavier weight depending on your target, and do the max number of reps possible with that weight. Again, keep records of your lifts so you have a basis for planning your targets for various exercises over several weeks of training.

While I recommend performing a single set of each exercise on most days, you may decide to explore programs that require multiple sets using various repetition ranges. Another concept in strength training is periodization, which involves systematically manipulating training volume and intensity by varying the sets and repetitions used during a series of training cycles, usually lasting a couple weeks each. When you are no longer a novice weightlifter, it may be necessary to use alternate strategies to vary the challenge to the muscles to stimulate further gains. Various periodization formats include linear (or block) and nonlinear (undulating). Here are links to a couple articles that provide a little more background (bearing in mind these formats are more complex and time-consuming than a single-set format and not necessarily superior, especially for a BUD/S candidate). [Links posted August, 2015 - I will remove them if I find they become broken or I find better examples.]

http://www.researchgate.net/profile/Anelena_Frollini/publication/38086942_Comparison_between_linear_and_daily_undulating_periodized_resistance_training_to_increase_strength/links/0deec52279b0deea88000000.pdf

http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=1496&context=ecuworks2012&sei-redir=1&referer=http%3A%2F%2Fscholar.google.com%2Fscholar%3Fhl%3Den%26q%3Dundulating%2Bperiodization%26btnG%3D%26as_sdt%3D1%252C5%26as_sdtp%3D#search=%22undulating%20periodization%22

Exercise Order

A general rule is to alternate push and pull movements. For example, alternate bench press, shoulder press or dips with lat pull-downs, curls, or row pulls. Pair leg extension with leg curls or sit-ups with back extension. The exact order doesn't matter, as long as there is overall balance between opposing movements during a workout and especially across many workouts. It is commonly recommended to start with large muscle groups before small, or multi-joint exercises before single-joint exercises (so begin with exercises like deadlift, squat or leg press). Exhausting smaller muscles first may limit performance on the complex exercises. On the other hand, starting with large-muscle exercises may expend so much energy you will not be very productive for the remainder of the workout. I don't think there is any clearly optimal strategy here, so experiment a little bit to see what works for you. Another strategy you might try is to make a list of all the basic movements and perform them in the same order every workout, but each time start at a different point on the list (e.g., 1-2-3-4-5, then 2-3-4-5-1, then 3-4-5-1-2, etc.) That way, at some point you get to perform every exercise while you are fresh and able to give maximum effort. Still another strategy is to always begin with the exercise(s) giving you the most trouble, again with the idea that you will be fresher and better able to give a quality effort.

Variety and Consistency

When putting together a strength program, it is important to strike the right compromise between doing enough different exercises to effectively strengthen the whole body, but not so many that you spend too much time in the gym, become overtrained, or perform exercises too infrequently to see the benefits. Be selective with the specific things you try to develop, and as you reach plateaus, change up your routine a bit. Take out some exercises, add new ones. Don't do it so often that you don't have time to adapt, but do it often enough so that you don't get stale. Don't do it randomly, but in a systematic manner calculated to advance your overall fitness and address your weaknesses. There is a saying: if you want to find water, don't dig 100 wells one foot deep. Complex movements, large muscles, simple movements, small muscles, prime movers, stabilizers, core, max strength, muscular endurance - you can't train everything all the time. So try to be smart, and build a program with as much quality as quantity.

As a frame of reference, to give people ideas about how you might put together some workouts, I am providing some examples of PTs I've led over the past few months with different groups at NSWCEN. Most of the sessions I do are a weekly workout with PTRR ("white shirts" waiting to enter a BUD/S class, including guys that have been rolled from a previous class because of injury or performance, prior to Hell Week) as well as BSRB ("brown shirts" who have completed Hell Week but have been rolled to a later class because of injury or performance. I also do sessions with new SQT classes, with SWCC students waiting to begin BCT, and SEAL and SWCC Instructors just beginning their tour.

One thing to recognize about these workouts is the same basic format, exercises, techniques, etc. are appropriate (and recommended) for everybody. I make a few adjustments depending on a few factors; for example, sometimes I might only have a dozen Instructors, other times I might have 200 white & brown shirts. The PTs are all "Grinder" style, the only equipment to work with being the ground, some pull-up & dip bars, and occasionally some light dumbbells. Sometimes the groups consist mostly of new guys and I have to slow things down to teach and explain the movements; if I've worked with a group a few times we can get right into the workout sooner and get more accomplished in an hour (which is the standard time frame for these PTs). If a PT is being performed just before or after a tough run or swim or o-course, I may go easier on exercises that hammer the arms or legs than I would for stand-alone workouts.

I've already written pretty extensively about the general considerations for these PTs. The idea is to create a whole-body workout, with activities that challenge the upper body, lower body, and trunk, balanced front-back, left-right, etc. Move in multiple directions and planes. Every workout doesn't have to be absolutely perfect, as long as over the course of training things even out (just like, in regards to nutrition, every meal doesn't have to be perfectly balanced but your overall nutrition should be). I tend to break PTs into distinct upper/trunk/lower segments just because of the logistics of teaching large numbers of people, but that's not necessary for individuals (in fact, it would probably be good to mix things up more often). Major requirements when I lead PT are that the movements be performed through the full range of motion, in a controlled manner, emphasizing the negative/eccentric phase. I also emphasize that the same basic approach (movements and technique) would apply in the weightroom with dumbbells, bars, or machines to apply resistance.

I won't explain every exercise in the examples below (that information has generally been provided elsewhere, such as in the PTG), but there are a few points I'll mention. The basic upper body routine includes pushing and pulling up/down and out/in. The basic pushing movements are push-up (out), dip (down) and pike push-up (like a regular push-up but with a sharp bend at the hips - a pike position - to direct the trunk more perpendicularly and create an overhead resistance, or "up". I much prefer these over handstand push-ups for several reasons, including better range of motion and less stress on the shoulder). For the pushing movements I begin in the up position and move slowly through the negative portion while counting "1-2-3"; students count reps during the upward (positive, concentric) portion. The basic pulling movements are pull-up, chin-up (underhand grip), and inverted rows (horizontal pull-ups hanging from the dip bars). For these exercises, I have students mount the bar and hang until I call "up", at which time they lift their chins entirely over the bar (chest touches the bar for inverted rows), and hold that position until I call "down", at which point they count the rep and slowly lower to full extension until I call "up" again. I vary the cadence a little to make sure everyone is paying attention. For the pulling exercises, those who can't complete a set drop off the bar when they can no longer maintain proper form. After the rest of the class finishes, I have them mount the bar and finish the remaining reps with proper form. (This is not punishment. It is simply allowing people to progressively build fitness until they can complete the set unbroken.)

The trunk exercises include all variety of sit-ups, crunches, knees-to-elbows, etc. to work the trunk flexors; Superman variations for the back & glutes; and wipers or Russian twists for rotation. I also use a lot of static (isometric) holds like plank, side plank, bird dog, and bridge. I also use a lot of leg lever holds (lie on back with legs straight, feet six inches off the ground) emphasizing neutral pelvis (small of the back stays pressed against the ground; no arch in the back; supporting with hands under the butt is discouraged and the goal is to be able to hold the correct position with arms folded across chest).

Lower body exercises are intended to flex and extend the hips, kness, and ankles as well as work the hips and ankles laterally. Always think in three dimensions. Exercises include vertical jumps, emphasizing an explosive jump coupled with proper, controlled landings (bend the knees to absorb impact, keep knees aligned between feet and hips); standing long jumps; and lateral jumps. (I almost never use air squats.) Also all variety of lunges, some carioca, and sprints. Sprints are short (generally around 40 yards), 4-6 reps, requiring a change of direction (COD) - cut right/left 45 or 90 degrees, or down & back.

My goal with these PTs is to be consistent enough to let students learn the specific exercises and see progress as they get more fit, but to have enough variety to keep things fresh and interesting for those who spend weeks (or months) working with me before classing up. Using this format, many guys struggle to get 10 pull-ups or 20 push-ups. Not many guys can hold a correct plank for two minutes or a proper leg lever or bridge for even a minute, and wipers are difficult. The most meaningful exercises are simple to perform, so I encourage aspiring candidates to work on them regularly.

Sample PTs

Some sample PTs used over the past few months (2015). Consult other posts as well as the PTG for descriptions/explanations of exercises.

Sample #1

12 pull-ups
12 clapping push-ups
1' plank, side plank (L, R), leg lever hold, bridge (L, R)
12 chin-ups
12 pike push-ups
Manual shoulder Y & external rotation
1' plank, side plank (L, R), bird dog (L, R)
20 wipers
12 horizontal pull-ups
12 dips
10 standing long jump (SLJ)
2x60" heel walk
20 1-leg lateral hops (alt. R-L)
Manual hamstring

Sample #2

12 pull-ups
12 clapping push-ups
12 horizontal pull-ups
12 pike push-ups
20 (4-count) arm haulers
12' continuous/1' each: front plank; side plank (L, R); leg lever hold; bridge (L, R); front plank: side plank (L, R); bird dog (L, R); leg lever hold
20 wipers
2x60" heel walk
2x lateral shuffle (R 20yds, L 20yds)
10 SLJ
2x8 Nordic hamstring

Sample #3

20 push-ups (alt. regular, clapping)
12, 8 horizontal pull-ups
60" Superman w/ Y
20 reverse crunches
20 (4-c) active bird dog
2x20 bridge (reps: alt. 10R, 10L)
20 (4-c) scissors
20 wipers
W/u & drills: butt kick, high knees, carioca, acceleration
Sprint 6x40yds (start from front or side plank): cut 45 degrees R, L; down & back (touch R, L); FWD-BWD

Sample #4

12 chin-ups
12 pike push-ups
12 horizontal pull-ups
12 dips
90" front plank, side plank (L, R), bridge (L, R), leg lever hold, bird dog (L, R)
60" front plank, side plank (L, R), bridge (L, R), leg lever hold, bird dog (L, R)
20 (4-c) scissors
50yd heel walk
2x50yd carioca
2x50yd lateral shuffle (R, L)
20 1-lef FWD hop (10L, 10R)
10 Nordic hamstring

Sample #5

12 clapping push-ups
12 horizontal pull-ups
10 clapping push-ups
10 horizontal pull-ups
20 (4-c) arm haulers
4x30" each: front plank, side plank (L, R), bridge (L, R), bird dog (L, R)
25 reverse crunch
25 wipers
20 standing lunge (10L, 10R)
8 Nordic hamstring
20 standing lunge (10L, 10R)
8 Nordic hamstring

Sample #6

12 pull-ups
12 clapping push-ups
20 (4-c) arm haulers
2' each: bridge (L, R); side plank (L); front plank; side plank (R)
25 sit-ups
25 wipers
2x60" heel walk
10 SLJ
W/u: butt kickers, high knees, carioca
4x (5-10-5yd agility), alt. R, L

Sample #7

8, 6 chin-ups
8, 6 dips
Manual shoulder Y & ER
12' continuous/1' each: front plank; side plank (L, R); leg lever hold; bridge (L, R); front plank; side plank (R, L); bird dog (R, L); leg lever hold
[Repeat 12' sequence]
20 (4-c) scissors
20 scorpion (alt. R, L)
20 standing lunge (10L, 10R)
Manual hamstring

Sample #8

11 dips
11 pull-ups
11 pike push-ups
22 (4-c) arm haulers
22 push-ups (alt. reg/clapping)
22 reverse crunches
Continuous, 75" each: bridge (R, L), front plank, side plank (R,L)
[Repeat sequence]
22 (4-c) flutter kicks
22 wipers
12 SLJ
40yd sprints. down 20 & back 20: w/u x2; touch R or L x4 (start from prone position); FWD/BWD x1
22 1-leg lateral hops (alt. L-R)
2x8 Nordic hamstring

Sample #9

12 chin-ups
12 pike push-ups
2x45" horizontal pull-up (static hold, chest against bar)
2x10 manual T
Front plank/side plank (R, L)/leg lever hold: variable durations switching between different positions; 5' total
2x10 (4-c) active bird dog (R, L)
2x10 reps, bridge (R, L)
24 wipers
20 scorpion (alt. R, L)
24 standing lunge (12R, 12L)
3x lateral shuffle (20yds R-L)
2x10 Nordic hamstring

Sample #10

10 pike push-ups
12 horizontal pull-ups
10 pike push-ups
12 horizontal pull-ups
20 (4-c) arm haulers
60" front plank, side plank (L, R), bridge (L, R)
90" front plank, side plank (L, R), bridge (L, R)
60" front plank, side plank (L, R), bridge (L, R)
20 lateral hops (2-leg)
20 1-leg FWD hop (10R, 10L)
2x60" heel walk
Manual hamstring

What Does It Mean To Work "To Failure"?

My basic recommendation for strength training has been to perform a variety of exercises that target muscles in the arms, legs and trunk, and to generally perform a single set to failure. It is worth discussing in a little more detail exactly what is meant by the phrase "to failure". For most users of the Physical Training Guide, and especially for novice or beginner weightlifters, here is a straightforward example. Let's say you are doing a set of overhead shoulder press using 40-lb dumbbells. You're standing with legs and back straight, feet approximately shoulder width, dumbbells just touching your shoulders with palms facing forward. You perform the first rep by abducting the shoulders and extending the elbows so the dumbbells rise smoothly above your shoulders and just barely touch above your head as your arms lock out. The dumbbells pause for half a second above your head before you lower them smoothly through the same path back to the starting position. Roughly speaking, the upward phase took 1-2 seconds and the downward (negative) phase took 3-4 seconds. You repeat these upward and downward movements exactly for five more reps (six reps total). On the seventh rep you notice it takes a little more time to lift the dumbbells through the upward phase, although you are still able to keep your legs and back straight and move the weight entirely with your shoulders and triceps. The eighth rep is a little more difficult still. On the ninth rep, as you start to push the dumbbells up your back noticeably sags and your knees noticeably bend; your technique is breaking down as you attempt to compensate for fatigue. It takes a good five seconds of struggling to finish the rep. You begin the tenth rep, and your technique is even sloppier; you struggle for several seconds to get the weights overhead, but you're stuck mid-way. Those dumbbells just aren't going to move any farther. So you rack the dumbbells and count nine reps (the ninth was a little sloppy, but if it wasn't too bad you can count it); you failed on the tenth rep. Over the next several sessions, you might do different shoulder exercises or do overhead dumbbell press with a different weight, but at some point you'll pick up the 40-lb dumbbells again and attempt to get ten reps; when you achieve that, you'll go for eleven, and so on.

Using pull-ups as an example, you'd hang from the bar and begin by pulling your chin up over the bar, and lower yourself down with control until your arms are again fully extended; you'd avoid using any kicking, jerking, swinging, or kipping movements. Perhaps after ten or twelve reps you're feeling fatigue set in and it is taking more time and more effort to complete each rep, and your legs may start kicking and pumping a bit, even involuntarily, as you try to squeeze out a couple more reps. At some point you know your form sucks and you still can't get your chin over the bar. So at that point you've "failed". The number of "good" reps you count will be a little subjective, but you'd better be aware of PST standards and have an idea of what you can do if someone else who might not be generous is doing the counting.

The above examples demonstrate simple positive failure; you keep trying until you can no longer complete a rep with good form. If you only go to this type of failure for one set per exercise per workout, you can do it pretty much every workout without fear of overtraining. There are other, more advanced and demanding degrees of failure that you might use when you've been training for several months, but I wouldn't use them every workout and the more intense version you use, the less frequently you should use it. If you are working with dumbbells, you can complete as many reps as possible with a given weight, and after you fail at that weight, quickly exchange for a couple of lighter dumbbells and complete a few more reps. If you happen to be using a machine with a weight stack and a pin that holds the number of plates you select in place, you can work to failure with a given weight and then quickly move the pin to a lighter weight and squeeze out a few more reps. This is one of the reasons I feel machines have their place in a well-rounded strength program. If you have a partner to spot you, as you begin to fail your partner can provide just enough assistance to let you force out another couple reps. For best results, your partner should help you lift the weight up, but you should lower the weight down with control on your own (muscles are stronger and don't fatigue as quickly when doing negative/eccentric contractions). This takes a little practice and communication so your partner provides enough but not too much assistance. The most advanced and intense version of failure would involve doing forced reps (with a partner's assistance) in both the positive and negative directions. For safety, I would not attempt to do this with free weights (though I've seen it done), but would only do it if you had access to the right kind of strength equipment, such as Hammer (your partner can quickly strip off the outer plates to lighten the load during the positive phase, and apply force to increase the resistance during the negative phase, without fear of hurting you if your muscles give out completely). I emphasize again that simple positive failure is safe and a good training stimulus for anybody. More advanced forms of failure should only be used by fit and experienced lifters, and not every workout.

My recommendation has been that strength sets generally be performed in the range of 8-12, which means that you would begin a particular exercise with a weight that causes you to fail after eight reps. As you continue training and as your strength improves, you keep going to failure but you will fail after more reps. When you get to twelve, next time bump the weight up and repeat the cycle again. I also recommend sometimes using heavier or lighter weights, causing you to fail at fewer than eight reps (say 5-7) or more than twelve reps (as many as 20). If you choose to do more than one set of an exercise, only do the final set to failure.

The "to failure" concept doesn't translate too well to calisthenics exercises (sit-ups, flutter kicks, lunges etc.) where you can do more than 20 reps per set. Push-ups and pull-ups may fall into this category, depending on your fitness and abilities. [For those struggling to do even the PST minimum of push-ups and pull-ups, I'll have to provide some different advice another day.] For muscular endurance exercises, where you are generally trying to do a higher volume of work, do sets until you are "pretty tired" but not absolutely unable to continue. Take a brief recovery and do another set until you are "pretty tired". The goal over days and weeks of training is to do a few more reps per set, and/or take less rest between sets. You may choose to do an exercise to total exhaustion (true failure, where you can no longer complete a proper rep), as part of some rare challenge, but be prepared to be sore and unable to train properly for a few days. If you do mega reps at high speed with bad form (which of course I strongly discourage), you run the risk of getting injured or contracting a condition such as rhabdomyolysis. As always, train hard, but train smart, and stay healthy.

Basic Template for PT/Strength Training

Here is a basic template for PT/strength training I use with students and Instructors. The same basic movement patterns and techniques can and should be used whether the workout is performed on the Grinder using only body weight for resistance, or in a gym with multiple resistance options such as free weights and machines. All the terms and concepts I've discussed previously still apply. There's nothing new here, but maybe said a little differently so the examples seem fresher. I want each workout to be as complete and well-rounded as possible, working the entire body (upper, trunk, lower) in multiple directions and all three planes. Every movement has an opposing movement (push-pull) to promote balanced strength. Movements are performed through the full range of motion with controlled, deliberate actions and exaggerating the negative (eccentric) portions. There are a couple Plyometric or explosive variations, but those are a small percent of the total work.

I group movements into twenty different categories (eight for upper, four for trunk, eight for lower). The goal is to use one movement from each category. Sometimes a category will be skipped, and sometimes more than one movement in a single category will be used, but try to utilize all categories equally. Some exercises will satisfy more than one category (e.g., squats satisfy both hip and knee extension). Usually do only one set for each exercise, varying the target reps on different days (see previous discussions above). A complete and effective workout can easily be accomplished in an hour and generally under 45 minutes.

Movement Categories

Here are the basic movement categories.

Upper Body:

1. Overhead push
2. Overhead pull
3. Chest press
4. Row pull
5. Downward push
6. Upward pull
7. Rotator cuff
8. Traps/posterior shoulder

Trunk (do a variety of dynamic exercises or static holds):

9. Flexion
10. Extension
11. Rotation
12. Lateral flexion/extension

Lower body:

13. Hip extension
14. Hip flexion
15. Hip abduction
16. Knee extension
17. Knee flexion
18. Ankle extension
19. Ankle flexion
20. Foot abduction/adduction

These movements don't have to be performed in any particular order, but it is best to alternate between pushing and pulling movements. When working with a group I segment the workout into upper/trunk/lower portions, but that's just for logistics. On your own, jump around however you want to make the workout flow well, and perhaps mix the order up on different days.

Here are the basic movements, with examples of exercises I would use during a Grinder-style PT. The only equipment available is pull-up and dip bars (plus a full water bottle weighing a couple pounds).

Grinder PT Movements

Upper body:

1. Overhead push - pike push-ups
2. Overhead pull - pull-ups or rope climbs
3. Chest press - push-ups or clapping push-ups
4. Row pull - horizontal pull-ups (on dip bars)
5. Downward push - dips
6. Upward pull - chin-ups (underhand grip; this is a simulation of a biceps curl, though the arms are actually overhead)
7. Rotator cuff - lying on side, perform shoulder external rotation using water bottle for weight
8. Posterior shoulder - arm haulers

Trunk:

9. Flexion - variations of sit-ups or crunches; knees-to-elbows; leg lever hold
10. Extension - front plank; Superman
11. Rotation - leg wipers or Russian twist; bird dog
12. Lateral extension - side plank

Lower body:

13. Hip extension - vertical jumps or standing long jumps (SLJ)
14. Hip flexion - sit-ups, flutter kicks, good morning darlings
15. Hip abduction - side plank; agility drills; 5-10-5yd sprints; carioca; side hops (1- or 2-leg)
16. Knee extension - vertical jumps; SLJ; lunges
17. Knee flexion - bridges; manual resistance (partner); Nordic hamstring exercise
18. Ankle extension - vertical jumps, SLJ
19. Ankle flexion - heel walks
20. Foot abduction/adduction - agility drills; 5-10-5yd sprints; side hops (1- or 2-leg)

Gym Movements

Here are the basic movements, with some examples of exercises that could be performed in a gym (this is not meant to be a complete list). Note any of the body-weight exercises listed above could also be used in a gym.

Upper body:
1. Overhead push - straight bar, dumbbells, kettlebells, machine (also lateral or front raise with dumbbells)
2. Overhead pull - pull-ups with vest, lat pulldown machine
3. Chest press - straight bar, dumbbells, kettlebells, machine
4. Row pull - straight bar, dumbbells, kettlebells, machine
5. Downward push - triceps pushdown or kickback, weighted dip
6. Upward pull - upright row, biceps curl, shrug
7. Rotator cuff - dumbbells, cable machine, elastic band
8. Posterior shoulder - dumbbells, cable machine, elastic band

Trunk:
9. Flexion - inclined bench, machine
10. Extension - RDL, machine
11. Rotation - cable wood chopper, medicine ball toss
12. Lateral extension - single arm push or pull with dumbbell or kettlebell (must hold torso stable)

Lower body:
13. Hip extension - squat, leg press, deadlift, kettlebell swing, box jump
14. Hip flexion - elastic band, machine
15. Hip abduction - elastic band, cable
16. Knee extension - knee extension machine, squat, leg press, weighted lunge, box jump, deadlift
17. Knee flexion - leg curl machine, elastic band, cable
18. Ankle extension - weighted heel raise, box jump
19. Ankle flexion - elastic band, machine, weighted heel walk
20. Foot abduction/adduction - elastic band, cable

I encourage plenty of variation of exercises on different days (i.e., don't do the same chest exercise like flat bench workout after workout after workout; use dumbbells and do incline/decline variations as well). An exercise like the deadlift is a great all-around exercise but it doesn't work any joint through a complete range of motion, so don't rely on it exclusively. There are some exercises such as renegade rows that hit at least three categories, but none perfectly. You may also choose to incorporate Olympic lifts, but my strong recommendation is to learn to do them correctly and only use them occasionally (if at all). Once again, the critical point is to create a balanced program that targets prime movers (so you can pick up logs and boats and stuff) but also stabilizing muscles so your shoulders, back, and knees stay injury-free.

Recommendations

I have been re-reading a paper that takes a critical look at the evidence (or lack of) that supports many common strength training beliefs. If you are interested, you can find the article here (it is very detailed and takes some time and effort to get through):
[Note: in August 2015 I can not find an active link for the article. The title is "A Critical Analysis of the ACSM Position Stand on Resistance Training", by Carpinelli, Otto, and Winett. It was published in the Journal of Exercise Physiology Online, Vol. 7, No. 3, June 2004.]
Below is a summary from the article, which is consistent with many recommendations I have made on this forum.

What is really known about the science of resistance training is contrary to the opinions expressed in the Position Stand. That is, the preponderance of research strongly suggests that gains in muscular strength, hypertrophy, power, and endurance are the result of the following simple guidelines:

- Select a mode of exercise that feels comfortable throughout the range of motion. There is very little evidence to support the superiority of free weights or machines for increasing muscular strength, hypertrophy, power, or endurance.
- Choose a repetition duration that will ensure the maintenance of consistent form throughout the set. One study showed a greater strength benefit from a shorter duration (2s/4s) and one study showed better strength gains as a result of a longer duration (10s/4s), but no study using conventional exercise equipment reports any significant difference in muscular hypertrophy, power, or endurance as a result of manipulating repetition duration.
- Choose a range of repetitions between three and 15 (e.g., 3-5, 6-8, 8-10, etc.). There is very little evidence to suggest that a specific range of repetitions (e.g., 3-5 versus 8-10) or time-under-load (e.g., 30s versus 90s) significantly impacts the increase in muscular strength, hypertrophy, power, or endurance.
- Perform one set of each exercise. The preponderance of resistance-training studies shows no difference in the gains in muscular strength, hypertrophy, power, or endurance as a result of performing a greater number of sets.

- After performing a combination of concentric and eccentric muscle actions, terminate each exercise at the point where the concentric phase of the exercise is becoming difficult, if not impossible, while maintaining good form. There is very little evidence to suggest that going beyond this level of intensity (e.g., supramaximal or accentuated eccentric muscle actions) will further enhance muscular strength, hypertrophy, power, or endurance.
- Allow enough time between exercises to perform the next exercise in proper form. There is very little evidence to suggest that different rest periods between sets or exercises will significantly affect the gains in muscular strength, hypertrophy, power, or endurance.
- Depending on individual recovery and response, choose a frequency of 2-3 times/week to stimulate each targeted muscle group. One session a week has been shown to be just as effective as 2-3 times/week for some muscle groups. There is very little evidence to suggest that training a muscle more than 2-3 times/week or that split routines will produce greater gains in muscular strength, hypertrophy, power, or endurance.

A similar article can be found here:
http://www.researchgate.net/profile/James_Steele4/publication/228830087_Evidence-Based_Resistance_Training_Recommendations/links/0deec517f801683f22000000.pdf

From the article's summary:
"We recommend that appreciably the same muscular strength and endurance adaptations can be obtained by performing a single set of approx. 8-12 repetitions to momentary muscular failure, at a repetition duration that maintains muscular tensions throughout the entire range of motion, for most major muscle groups once or twice a week. All resistance types (e.g., free-weights, resistance machines, bodyweight, etc.) show potential for increases in strength, with no significant difference between them, although resistance machines appear to pose a lower risk of injury."

Core Strength

The concept of "core strength" is addressed frequently in questions about general training as well as injury prevention. Here are some thoughts regarding training for "core strength".

"Core strength" is one of those fitness terms (like "functional") that is used so often and under such broad circumstances as to be practically meaningless. There is no clear or universal definition about what constitutes the "core", but we are generally talking about a lot of muscles - large/long muscles that travel the length of the trunk as well as small/short muscles that connect individual vertebrae; superficial as well as deep muscles; anterior, posterior, and lateral muscles; and muscles that stabilize and position not only the spine but also the shoulders and hips. Furthermore, while sometimes it will truly be "strength" that is lacking, it is just as likely to be endurance or activation (getting unused muscles to contract) that limits one's ability to stabilize and protect the spine and transmit forces from the ground to overhead. So rather than talking about "core exercises" as if a single exercise can train the core, it is better to consider a "core routine".

My core routines include trunk flexion, lateral flexion, and rotation using both dynamic (concentric/eccentric) and static (isometric) contractions. Different set and rep schemes emphasize strength or endurance. Two different strategies for improving the ability to hold static positions (such as front or side planks) include progressively holding a position for a greater period (e.g., 30 seconds to two minutes over several weeks) and holding a position for multiple short durations (15-20 seconds) with recovery periods. I also use variations of basic exercises/positions that are progressively more challenging (examples include basic side plank with both legs for support, to bottom or top leg only for support to target the outer or inner thigh; or bird dog in a purely static position to bird dog while moving the extended arm and leg back and forth in a 45 degree arc to activate the shoulder and hip stabilizers). We find that strength and endurance of trunk rotators is often underdeveloped in students, so I try to emphasize rotation in particular. My go-to exercise with a group is the leg wiper, and I also use scissors and scorpion. I encourage students to also do exercises like Russian twist, side-to-side medicine ball toss, and cable wood choppers on their own time. Read through my previous posts on this thread for more ideas and details. It is not practical to do all variations (dynamic, static, activation) during every workout, so I generally choose 4-6 exercises or positions that hit flexion, extension, lateral flexion, and rotation during any given workout.

This isn't meant to be an exhaustive or definitive treatment of core training, just a few basic concepts to consider for an effective and well-rounded program. One other method of targeting the core during a strength session is to perform push or pull dumbbell exercises using a single dumbbell (one arm). This will engage the core muscles to stabilize the torso as the dumbbell moves through its range of motion. Examples include standing overhead press or lateral (deltoid) raises, or standing biceps curls or bent-over row pulls using a bench to support the opposite side. (Don't hold a dumbbell with the arm that is not exercising - it will act as a counterweight and reduce the stabilizing challenge to the core muscles.) One exercise I like to use occasionally to combine core training with lower leg training, not to mention shoulder development, is a dumbbell curl-to-overhead press while standing on one leg. Hold a dumbbell in the left hand with your arm at your side while balancing on your left foot. While maintaining balance on the left foot, swing the dumbbell smoothly in a curling motion to a position above the shoulder, and continue lifting the dumbbell overhead until the arm is fully extended. Pause briefly, then lower the dumbbell back to the shoulder and then down to the side. Repeat for 10-15 reps, attempting to remain balanced on one foot the entire time. Do the same using the other arm while balanced on the other leg. Gradually progress using the heaviest weight you can handle while maintaining balance and getting complete extension overhead. As the dumbbell swings through an arc going up and down, the changes in center of gravity will challenge the stabilizing muscles around the ankle and calf, as well as transverse muscles in the trunk.

Addendum

A new page has been added to the Physical Training Guide with video clips demonstrating simple exercises that will enhance performance and injury resistance.

http://www.sealswcc.com/navy-seal-naval-special-warfare-physical-training-guide-exercise-videos.html

Nutrition Guide

Naval Special Warfare Nutrition

By Mike Caviston, Director of Fitness, NSWCEN

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Editor's Note

This content was originally posted by Mike Caviston in an online form. All I have done is format his material into a printable document. Any edits I have made are for readability, but none of the content has been changed.
Source:
https://www.sealswcc.com/forums/forum/fitness/nutrition-aa/150-nutrition-start-here

Athletic Nutrition

Here are some nutrition concepts pertaining to athletes (and therefor BUD/S and SWCC candidates). These and other points will be discussed more fully in the future.

Diet

Diet refers to the sum total of all the foods we eat. Don't think in terms of bad foods that can never be eaten (unless of course you are allergic, such as shellfish or peanuts). However, there are foods that should be eaten infrequently and in small quantities, because they lack nutrients or may be harmful in large concentrations. There are no magic foods that guarantee good performance - but there are foods that are highly nutritious and should be eaten fairly frequently. There is plenty of room for personal preference, and you can skip foods you just plain don't like if you look for nutritious alternatives. Every meal doesn't have to be perfect, but an optimal diet for health and performance will on the whole have a good mix of foods from various categories.

Variety

Variety is a key element of good nutrition. Don't fall into a rut and eat the same foods or meals day after day. Make an effort to seek out new nutrient-dense foods and make them part of your diet. A simple strategy: try to get many different colors on your plate at mealtime.

Make sure your diet meets your **energy needs**. If you have a healthy body composition and are beginning strenuous physical training, make sure to increase your food intake accordingly. If you need to lose some excess body fat, you need to achieve a negative calorie balance by making sure your activity level is a little greater than your food intake. Cut back on empty calories, but make sure to still eat enough to get adequate nutrients (energy + vitamins and minerals).

Accept **information** about nutrition from trusted, credible sources. Learn to recognize and avoid Fad Diets. The Internet contains a lot of information - and misinformation.

A general framework for discussing nutrition is to consider the **relative proportion of calories** from carbohydrates, proteins, and fats (abbreviations: CHO, PRO, and FAT) in the diet. Each of these energy-providing nutrients is essential to health and performance. Experts from the Department of Health and Human Services (HSS) and the Department of Agriculture (USDA) review the most current scientific and medical research, and provide guidelines for CHO, PRO, and FAT content in the diet. A broad range of values is acceptable: 45-65% of total calories for CHO; 10-35% of total calories for PRO; and 20-35% of total calories for FAT. My specific recommendations for BUD/S and SWCC candidates are to get enough carbohydrates in the diet to support strenuous physical training, to get adequate but not excessive amounts of protein, and the balance of calories from healthy fats.

If you are eating lots of food from a variety of nutritious categories, it is unlikely you will be **deficient** in any vitamins or minerals. Even so, I encourage candidates to eat a variety of foods that are good sources of calcium, iron, potassium, and magnesium. Non-food supplements won't be necessary except in a few cases with medical causes (e.g., lactose tolerance; anemia). While a multivitamin may not be necessary, a single-RDA multivitamin supplement will not be harmful. (Note that vitamins are supplements, and supplements are not allowed during the selection and training pipelines.) Look for a supplement with a U.S. Pharmacopeia (USP) logo. Avoid high concentrations of single vitamins or minerals.

Supplements

Avoid protein **supplements** or other commercial performance-enhancing products, including energy drinks such as Red Bull, Rockstar and Monster. The reasons range from expense, to ineffectiveness, to danger in excessive amounts, and the possibility of unknown harmful contaminants.

Hydration

Hydration is an oldie but a goodie. Drink plenty of fluids, mostly water, throughout the day. It's not enough to drink shortly before, during, and after exercise. When you are training hard, you need to get into the habit of aggressively hydrating all day long. Urine output should be fairly high and relatively clear. You should wake up at night to use the bathroom, or at least have a strong need to urinate first thing in the morning.

Resources

Some Nutrition Resources:

Evidence-based information on Nutrition and Athletic Performance (joint position statement by the American College of Sports Medicine, the American Dietetic Association, and Dieticians of Canada):
http://journals.lww.com/acsm-msse/Fulltext/2009/03000/Nutrition_and_Athletic_Performance.27.aspx

National Athletic Trainers' Association Position Statement: Evaluation of Dietary Supplements for Performance Nutrition
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3554028/pdf/i1062-6050-48-1-124.pdf

Human Performance Research Center (A DoD initiative under the Force Health Protection and Readiness Program)
http://hprc-online.org/

Dietary Guidelines for Americans 2015
http://health.gov/dietaryguidelines/2015/

USDA National Nutrient Database (search for nutrient info on various foods)
http://ndb.nal.usda.gov/

Alcohol and Performance

Alcohol and Performance
(Originally posted on October 29, 2009)

Alcohol consumption has long been a part of the tough-guy culture of communities ranging from sports teams to law enforcement to the military. These people typically work hard and play hard. Going out drinking with your buddies after a tough week of training is generally seen as a legitimate way of letting off steam, and the ability to drink more than one's peers is often considered a positive quality. I am not interested in debating the value of alcohol in society or listing the many hazards associated with excessive alcohol consumption, since these are thoroughly documented elsewhere.

What I want to address are the potential effects of moderate alcohol consumption on physical performance and the adaptations to physical training. I am not talking about an amount that would make you drunk or cause you to blow beyond the legal limit on an alcohol breath test. I am talking about the possible effects that a couple drinks on the weekend might have a couple days later, such as might happen to a BUD/S student relaxing and having a couple beers while watching a ball game on Saturday night and then having to perform a 4-mile run at 0600 Monday morning. The alcohol consumed in the beer would be metabolized in a matter of hours, but alcohol disrupts the function of a number of enzymes that regulate the metabolic reactions responsible for physical performance. It might be more than 48 hours before these disruptions are returned to normal.

Effects of Low-Moderate Alcohol Consumption on Performance

Here are some of the acute effects of alcohol consumption on physical performance and adaptations to training:

- Decreased aerobic capacity (ability to utilize oxygen to liberate energy during muscular contractions)
- Decreased lactate threshold (more lactate accumulates in the muscles for a given amount of work, a condition associated with quicker fatigue)
- Increased dehydration (due to the diuretic effects of alcohol)
- Reduced glycogen content in muscles (glycogen is the storage form of carbohydrate and is the primary fuel used by muscles; lack of glycogen is the primary cause of fatigue during physical evolutions that require stamina or endurance)
- Decreased protein synthesis and increased protein catabolism (resulting in failure to add muscle or even loss of muscle mass)
- Deceased ability to regulate body heat (resulting in a greater heat load for a given amount of work performed)
- Interrupted sleep patterns (less rest and recovery)
- Suppressed immune system, meaning increased susceptibility to bacteria and infectious diseases
- Increased Rating of Perceived Exertion (RPE) for a given workload, which means a pace that would ordinarily be comfortable will feel harder, and a pace that would ordinarily be difficult may become intolerable

In all honesty, these effects are not likely to be extreme after only a couple beers, but they will be measurable. Some people will be more strongly affected by a given amount of alcohol than others, and the greater the amount of alcohol consumed, the greater the effects on anybody. Even relatively small amounts of alcohol consumed regularly will chip away at the gains in endurance and strength you are trying to make through training. A single bout of drinking may be enough to keep you from hitting your target on a PST or other timed evolution, if you are on the bubble. Every individual must weigh the pros and cons of alcohol against his own abilities and goals. For example, students in BUD/S may choose to celebrate the completion of another week of training by having a couple drinks with their classmates. It is a good mental strategy to create rewards for yourself during intense training to help motivate you from one stage to the next, but it should go without saying it is counterproductive to negate the effects of training with excessive consumption of alcohol.

The effects of drinking a couple beers aren't permanent, but they last long enough to disrupt training, even slightly. For a day or two, you won't be able to run quite as hard or as long as you would have, or your muscles won't respond to your weight sessions the way they should. Repeat this pattern often enough, and the little bits missed here and there add up to a lot of missed opportunity. Drinking is a personal choice, but if you are committed to doing everything possible to maximize your physical abilities, you may ask yourself if alcohol is a reward you simply can't live without.

Fad Diets

Recognizing Fad Diets

SEAL and SWCC candidates need to optimize their nutrition to maximize health and performance and increase the probability of making it through the selection process. Seek nutrition information from valid, qualified sources. There is a multi-billion dollar industry built around diet books and nutrition websites, and people are willing to pay big bucks to get what they hope will be a ticket to weight loss as well as gains in strength and endurance. I've preached the need for basing diet on sound principles of the science of nutrition, so I won't burden you with a long lecture here. But when planning your nutrition, I encourage you to be aware of the existence of Fad Diets. Their popularity comes from good marketing more than verified results. Here are some signs to watch for:

- Recommendations that promise a quick fix
- Claims that sound too good to be true
- Lists of "good" and "bad" foods
- Overemphasize benefits of some foods; overemphasize dangers or negative effects of other foods
- Eliminates entire groups of foods
- Emphasizes combining foods in certain ways or avoiding certain combinations of foods
- Requires specific ratios of carbohydrates, fats and proteins
- Rigid menu plan with limited food choices
- Promotes need for supplements
- Recommendations based on a single study
- Simplistic conclusions drawn from a complex study
- Recommendations based on studies published without review by other researchers

- Dramatic statements that are refuted by reputable scientific organizations and peer-reviewed research
- Recommendations made to help sell a product
- Reliance on testimonials, anecdotes, and endorsements by celebrities or athletes

Some classic examples of Fad Diets include the Atkins and South Beach diets, popular with people trying to lose large amounts of weight. Some diets that have caught the fancy of SEAL and SWCC candidates (and Operators) include Zone, Paleo, and Warrior. A common theme with these diest is restriction of the intake of carbohydrates. As I have emphasized previously, adequate carbohydrate intake is essential to support strenuous physical training by serious athletes including candidates for BUD/S and BCT. Any diet will lead to weight loss if it results in reduced calorie intake (assuming energy expenditure does not decrease at the same time). Diets such as Zone and Paleo may work for people who exercise less than an hour a day, but are unlikely to provide adequate CHO for people training 2-3 hours a day. Some people follow these diets rather loosely, and may supplement them with additional CHO to satisfy their training needs. Strict adherence to the Zone places an unnecessary burden on the individual to maintain very specific ratios of CHO/FAT/PRO and results in inadequate intake of calories and carbohydrates. The true Paleo diet is less clearly defined, but while the goal of minimizing processed foods is worthy, the loss of grains, beans, potatoes and dairy creates big nutritional gaps that are hard to fill from other sources.

Class 317 NSW Prep Course Training Schedule

Day 1	Day 2	Day 3	Day 4	Day 5
HOOYAH PT mix of total body pt (pushups, flutter kicks, air squats, arm haulers, lunges, pull-ups, neck bends, etc.) start out with 300 4 count jumping jacks. **Swim** 100 m kick 100 m lead arm skull 100 m 3 sec glide 100 m CSS + 1 stroke breast stroke for sighting 5 min tread (egg beater) **Run** 5 mile LSD @ 8 min pace	**Lifting** superset: 4 x 8 Zercher lunge 4 x 10yds monster walk 5 sets: 5 pull ups 10 burpees 15 kettlebell swings 20 x 4-count mountain climbers **Swim** Warm up- 8 x 50 lead arm skill (Belly rub, 3 sec glide, alt breathing drill?) 8 x 50 kick on side 1000 m w/fins for time tread practice with water bottle	**Swim** 8 x 50 warm up 200 m choice 600 m (100 free/100css/100breast x2) 6 x 50 w/fins free style sprints knots 9 foot, 5 tries underwater travel- 2 x with mask (1 without flip/1 with flip) 2 x without mask with flip **Run** 1 mile w/u 30 min farlek run (800 LSD/400 @ 80-90%) 1/2 mile cooldown	**Lifting** superset: 4 x 8 DB press 4 x 6-10 chin-ups superset: 4 x 10 DB goblet squat 4 x 10 yds monster walk conditioning WOD- 5 sets 5 sanDBag get ups 10 burpees 20 KB swings 40 4 count jumping jacks **Run** 1 mile w/u 20 min beach run 1 mile c/d	**HOOYAH PT** mix of total body pt (pushups, flutter kicks, air squats, arm haulers, lunges, pull-ups, neck bends, etc.) start out with 300 4 count jumping jacks. **Run** 6 mile LSD **Swim** 300 m w/u 8 x 50m w/fins 100m kick on side 100m 3 sec glide 100m belly rub 100m alt breathing drill 200m CSS fast 6 x 50m 100m 3/6/3 100m finger tip drag 100m catch up drill 200m free fast

Day 1	Day 2	Day 3	Day 4	Day 5
Lifting superset: 4 x 5 Deadlift 4 x 8 Knee to elbow superset: 4 x 8 Bench 4 x 6-8 weighted pullup Conditioning: 12 min continuous sanDBag get up with good form **Swim** warmup- 50 travel/200 choice/50 travel 2 x 50- CSS kick 3 sec glide CSS 2 x 50- 3 sec glide/alt breathing drill/belly rub free style kick on side free 400m CSS 2 x 200 free (3 stroke breath down, 5 stroke breath back) 4 x 100 CSS tread 5-15 mins	**Swim** Mock drown proofing (water con work) **Run** ½ mile warmup 35 min hill fartlek run ½ mile cooldown	**Run** 30 min LSD **Swim** w/u- 400m IM- 50m butterfly 50m CSS 50m breast 50m free free x 2- 100m kick on side 100m catch up drill 300m free CSS w/fins x 2- 100m kick 100m alt breathing drill 300m CSS 50m each- 8 dolphin kicks then breath 8 flutter kicks then breath **Lifting** superset: 4 x 8 Zercher squat 4 x 8 monster walk superset: 4 x8 DB shoulder press 4 x 6-8 weighted pullup 2 x 2 min max pushup	**SanDBag PT** SanDBag PT pyramid- 10 SanDBag get-ups (5 each side) 1 lap chest carry 20 presses 1 lap head carry 30 4 count sit-ups 1 lap chest carry 40 x 4-count chest carry lunges 1 lap head carry Cardio Circuit: 1 rope climb 5 belly grinders 5 box jumps sled push/pull 30 yd farmers walk **Run** 15 min LSD	No 5th session, but an additional lifting session and working on anything that needs extra work might be a good idea

Day 1	Day 2	Day 3	Day 4	Day 5
Mock exist PST 1000m w/fins 2 min pushups 2 min sit ups max pull ups 4 mile run	**Lifting** superset: 4 x 5 Deadlift 4 x 10 Knee to elbow Superset- 4 x 10 lunges 4 x 10 weighted dips 4 x 6-8 weighted pullups 15 min Continuous: 5 KB squats 10 KB swings **Swim** Warmup - 300m choice Tread w/out fins 7 mins 6 x 50- fin kick catch up/alt breathing drill/3 sec glide free/css 300m @ 6 min 400m @ 8 min 300m @ 6 min 300m @ 6 min 200m free fin tread 10 min	**Swim** knot tying/drown proofing **Run** 40 min LSD **SanDBag PT** chest carry 1.5-2 mile Head carry 0.5-1 mile Overhead press hold 20-25 sanDBag sit-ups 15-25 sanDBag lunges 10 pullups	**Lifting** 4 x 10 squat superset: 4 x 10 bench 4 x 10 face pulls 5 rounds: 10 pullup/chinups 10 knee to elbow 10 KB swings 10 mountain climbers 10 burpees **Run** 7 mile LSD	**HOOYAH PT** mix of total body pt (pushups, flutter kicks, air squats, arm haulers, lunges, pull-ups, neck bends, etc.) start out with 300 4 count jumping jacks. **Run** 4 x 1 mile repeats on 10 min **Swim** 2 x 25 min CSS- 1 w/fins, 1 w/out fins 100m turtle back

Day 1	Day 2	Day 3	Day 4	Day 5
Run 1 mile warmup 4 laps @ race pace, 5 min break 3 laps @ race pace, 4 min break 2 laps @ race pace, 3 min break 1 lap @ race pace, 5 min break 4 laps @ race pace, 5 min break 3 laps @ race pace, 4 min break 2 laps @ race pace, 3 min break sanDBag- 2x- low crawl 50 yds 30 presses 50 sittups low back crawl 50 yds 30 presses 50 sittups suit case walk 150yds down and back lunge 100 yds **Swim** 200m mixer 10 x 100m CSS on 2min 4 x 100m free on 2 min 6 x 100m CSS on 2 min 200m c/d	**Lifting** superset: 4 x 5 deadlift 4 x 8 KB press 4 x max pushup 3 rounds: 1 min pushup 30 sec break 1 min KB swing 30 sec break 1 min 4-count mountain climber 30 sec break 1 min alt lunge **Swim** Warmup- 300m mixer (choice of strokes I guess) 4 x 100 CSS on 2 min 100m choice easy 4 x 100 CSS on 2 min 100m choice easy 200m CSS fast 10 min fin tread 5 min tread (no fins)	**Run** Warmup- 2 mile 8 x 400 on 5 min ½ mile cooldown **Swim** drown proofing skills 4 x 200- odd, CSS flutter kick even, free style h2o turns (flip turns?) 4 x 200 CSS w/fins	**Lifting** superset: 4 x 10 Zercher lunge 4 x 10 knee to elbow superset: 4 x 10 bench 4 x 8-10 weighted pullups 5 rounds: 10 inverted rows 15 burpees 20 KB swings 25 4 count mountain climbers **Run** 30 min beach run	**HOOYAH PT** mix of total body pt (pushups, flutter kicks, air squats, arm haulers, lunges, pull-ups, neck bends, etc.) start out with 300 4-count jumping jacks. **Swim** 400m w/u 2 x 200m free on 4 min 300m CSS on 6 min 2 x 200m free on 4 min 35 min CSS w/fins 200m turtle back **Run** 7 mile LSD

Day 1	Day 2	Day 3	Day 4	Day 5
30 min SanDBag PT rotated through lunges/sittups/press **Swim** 400m IM (butterfly/CSS/breast/free) 6 x 100m- 50m drill 50m free 5 x 200m CSS w/fins on 3:45 8 x 100m CSS w/fins on 2 min 200m jump in, flip, CSS **Run** 4 x 1 mile repeats in sand	**Lifting** superset: 4 x 5 deadlift 4 x 3 sanDBag get up (3 each leg) superset: 4 x 8 KB press 4 x 10 weighted pullups 3 rounds: 5 goblet squats 10 KB swings 10 goblet squats 20 KB swings **Swim** 200m w/u- 50 travel 100 choice 50 travel 8 x 50m kicKBoard 4 x 100m on 2:10- 25m free 2 breaths 25m CSS 25m breast 25m free 2 breaths 4 x 100m on 2 min- 25m free 2 breaths 25m CSS 25m breast 25m free 2 breaths 4 x 50m CSS on 1:30 100m c/d tread- 5 min w/fins, 5 min w/out fins	**Swim** knots/drown proofing **Run** 1 mile warmup 6 x 800m on 6 min 1/2 mile cooldown	**Run** 1 mile w/u 20 min sand run 1 mile c/d and 8 striders **Lifting** superset: 4 x 10 Zercher squat 4 x 10 yds monster walk superset: 4 x 10 bench 4 x 10 neutral grip pullups 50 right arm KB swings 50 left arm KB swings 100 lunges 50 burpees 50 mountain climbers	**Monster Mash** 4-5 miles sanDBag march (2 mile alt chest/shoulder/head carry, the rest carry the sanDBag on your back)

Day 1	Day 2	Day 3	Day 4	Day 5
Run hill sprints- 5 long/5 short **Swim** warmup- 50m travel 300m choice 50m travel 6 x 100m 5 strokes per breath 5 x 300m- odd CSS even free 5 x 100m CSS on 2 min 10 x 50m CSS on 1:10	**Swim** 300m w/u- 50m travel 200m choice 50m travel 6 x 100m- 50m 3 stroke per breath 50m 7 strokes per breath 400m CSS w/fins on 8 min tread 400m CSS w/fins on 8 min tread no fins tread- 2 x 30 sec recovery 30 sec left hand out 30 sec right hand out 30 sec recovery 30 both hands out **Lifting** superset: 4 x 5 deadlift 4 x 10 1 arm KB press 4 x max pullup/chin-ups 4 rounds: 10 right arm KB swings 20 KB swings 10 left arm KB swings 20 KB swings	**Lifting** Session of your choice **Swim** Drown proofing **Run** 30 min LSD	**Exit PST** 1000m swim w/fins 2 min pushups 2 min sittups max pullups 4 mile run	**Run** 45 min total 15 min LSD 15 min moderate 15 min race pace **Lifting** Pullup pyramid (pyramid or pyramids of choice, I suppose, no specifications given) superset: Zercher squat- 6,5,4,3 Bat wings- 4 x 20 sec superset: 3 x 10 sandbag lunge (each leg) 3 x 8 alt DB press 3 x 20 sec rotational resistance superset: 10 KB swing 10 pushups